FACTORY ADMINISTRATION AND ACCOUNTS

EDWARD T. ELBOURNE

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FACTORY ADMINISTRATION AND ACCOUNTS

FACTORY ADMINISTRATION AND ACCOUNTS

A BOOK OF REFERENCE WITH TABLES AND SPECIMEN FORMS,
FOR MANAGERS, ENGINEERS AND ACCOUNTANTS

BY
EDWARD T. ELBOURNE
FORMERLY WORKS ACCOUNTANT TO MESSRS. VICKERS, SONS & MAXIM, LTD., ERITH,
AND DEPARTMENTAL WORKS MANAGER TO THE BIRMINGHAM SMALL ARMS CO. LTD.

WITH CONTRIBUTIONS ON

THE GENERAL PROBLEM OF INDUSTRIAL WORKS DESIGN

BY
ANDREW HOME-MORTON
M.Inst.C.E., M.I.Mech.E., M.I.E.E., M.Cons.E.
OF HOME-MORTON, KER & GIBSON, MM.INST.C.E., CONSULTING ENGINEERS
AND INDUSTRIAL WORKS DESIGNERS

AND

FINANCIAL ACCOUNTS

BY
JOHN MAUGHFLING
Chartered Accountant
SECRETARY TO MESSRS. JOHN I. THORNYCROFT & CO. LIMITED

LONGMANS, GREEN, AND CO.
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INTRODUCTION

The aim of this work is to present an analytical study of the problems pertaining to factory administration and accounts as a whole, in such a way as to be understandable alike by the business man, the accountant and the engineer. Previously the subject of management, more particularly works management, has been written of as being apart from works accounts, in any full sense, and especially from financial accounts. The present comprehensive treatment has necessitated virtually two books in one, and special attention has therefore been given to condensation in tabular form, wherever possible. Further, to bring this within practical reach it has been necessary to consider more specifically the class of factories or works engaged in the engineering and machine making industries.

In attempting to set out the problems that necessarily arise in administration, the author has sought to elucidate principles rather than to enlarge on the particular methods of any one firm, which must necessarily be governed by special conditions, and in many details, reflect the peculiarities of staff arrangements.

Touching the problem of analysis, there has seemed no alternative to referring to some items under a number of heads. This has increased the responsibilities attaching to the index, but has made for more complete discussion under the respective heads or sections.

The work as a whole may hardly be said to reduce administration to a science, but it is intended as a demonstration both of the desirability and feasibility of a critical treatment of every routine essential to the well-being of a factory. As to what routine is essential to efficiency in any given case depends on local conditions rather than local opinion. The size of any Works does not regulate the relative size of all its problems as compared with larger Works, and it seems fundamentally wrong to tackle the consideration of this subject, in theory or practice, with the idea that the problems necessarily differ in kind. They certainly differ in degree, and they differ most in the relative risks attaching to neglect of proper routine or organisation.

The arrangement of the book is based on the sequence of the actual workings of a factory as far as practicable. The book is divided into six sections.

Section I. discusses the problem of Industrial Works or Factory Design in a general way with a view to giving a mental conception of the broad principles that should be kept in mind in the setting up of a factory, whether conducted wholly through a consulting engineer with the requisite qualifications or through an architect in collaboration with the works staff.

Section II. deals with General Administration, and consideration is given to the factors dominating it independently of any particular office arrangements. This method of treatment has been also adopted throughout the discussion on works administration, works accounts and financial accounts.

Section III. comprises a study and discussion of the common elements of Works Administration. The treatment is fuller than that of general administration, partly because the principles seem to lend themselves to more definite demonstration and partly because a certain elaboration is necessary to show the inter-relation of the works organisation with the commercial and accountancy requirmeents.

Section IV. is devoted to Works Accounts in considerable detail, with a view to providing a comprehensive grasp of the whole subject.

Appeal is made to Works Managers, in particular, to take the little trouble necessary to get from any of the available elementary text-books on book-keeping a sufficient grasp of the subject as not to be unable or uninterested to follow the accounting discussion in this book.

Section V. consists of a comprehensive set of Routine Forms which broadly embody the principles outlined in the preceding sections. The forms are grouped according to the departments first concerned with their use. Each form has been either selected or designed for the special purpose of illustrating the work, but the proved merits of successful practice have not been sacrificed in any modification for this purpose.

It should be clearly understood that these illustrations are illustrations, and do not apply equally to every set of conditions.

To the practical organiser the tabular illustrations will be helpful as starting points in considering the special requirements of various businesses—supported as the illustrations are by suggestive notes relative to the routine in each case.

It is a reasonable axiom that no routine form should be adopted at all unless the local conditions require it. Equally, on the other hand, no form should be adopted except as a considered step in the development of a coordinated scheme of organisation. The functions to be served by Section V. are therefore mainly to help towards the taking of long views and to focus the arguments advanced in the course of the book.

The forms are arranged so as to be read in the ordinary horizontal way, and are printed on right hand pages, so as to allow ready reference from any other point in the book. In the text of the book marginal references are given to the forms illustrating the subject matter of the discussion. The left hand pages facing the forms are ruled for the user of the book to set down comments and notes from other sources, particularly for applying the forms to any given works, where local considerations must almost necessarily entail modification, however small.

SECTION VI. presents a definite set of Financial Accounts adapted on the one hand to the system of works accounts advocated in Section IV., and on the other hand conforming with the requirements of sound accountancy and English Company Law.

Under the system here demonstrated a clear line of demarcation is drawn between works accounts and financial accounts, and the necessary interlocking clearly set out.

The Index has been constructed on full lines. Cross references are given for any terms in fairly common use, which are not adopted for the purposes of this work.

Discrimination in respect to terms has been made in writing the book so as to get a clearer meaning. Of course, if any conventional term were universally used, then no alternative term could very well be an improvement, but there is a great deal of variety in the terms used in different works and different localities regarding matters of routine. Any unusual terms adopted by the author are for the purpose of preventing the experienced reader from applying preconceived meanings to customary terms of vague meaning, and to save the layman from having to adopt some conventional term, the meaning of which does not jump quickly to his mind.

No alphabetical glossary of terms has been provided, but endeavour has been made to make the meaning clear in the course of the discussion, involving the use of the respective terms.

The author takes great pleasure in acknowledging his indebtedness to Mr. Andrew Home-Morton for his contribution on Works Design, and to Mr. John Maughfling for his contribution on Financial

Accounts, and invaluable co-operation in the comprehensive treatment of the accountancy aspect of factory administration. His further thanks are due to Mr. John Fearn, Mr. T. W. Loughborough, A.M.I.A.E., and Mr. Thomas Reid for their valued assistance in other ways. The author would also record his appreciation of the stimulus and advantage he has derived from association with Mr. J. S. Conradi, in the re-organisation of works, in the past.

E. T. E.

MARCH, 1914.

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Extracts from several Acts of Parliament and Government Papers have been given, by permission of The Controller of H.M. Stationery Office, to call attention to various requirements in the matter of works administration. In practice, however, the complete text should be before the Works Manager lest the omissions be found to qualify the local application of the extracts quoted.

Official copies of the Acts referred to may be obtained at very small cost through booksellers.

Truck Act, 1896 - - - - - - 69
Factory and Workshop Act, 1901 - - 70
Notice of Accidents Act, 1906 - - 74
Workmen's Compensation Act, 1906 - 75
National Insurance Act, 1911 and 1913 - 108
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SECTION I

THE GENERAL PROBLEM OF INDUSTRIAL WORKS DESIGN

The General Problem of Industrial Works Design.

General Considerations.

THE design of works and factories is a special branch of Applied Science. It should not merely mean the design of the structure or buildings, of the power plant, or of the works equipment, but should cover all these essentials and many others. It should mean the consideration of every problem which may arise from the conception to the realisation of the scheme, and should result in the correct co-relation of the financial, human and mechanical equipments of the industrial undertaking. In other words, the properly designed Works or Factory should be like a high class specially made machine-tool, carefully thought out in every detail, built at such a cost, and so arranged and equipped that, in the hands of the skilled operator or administrator, its product can be put on the market at competitive prices, and, after all charges have been met, show satisfactory profits for the investor.

Factory design along these lines is very much better understood and practised in the United States of America and in the Continent of Europe, than in Great Britain. There are reasons why this has been so in the past, but for the future those reasons will not suffice, and at the present time they need not be discussed. There are in Great Britain some of the finest factories in the World, there are also some of the most decrepit, and the average is low. Victory in the great international industrial war will be with that country which is best equipped and organised in its units or factories, and which makes full use of all the advantages and aids which science and progress offer.

There is a growing tendency amongst British manufacturers, when considering the establishment of new works or the reorganisation of existing factories, to avail themselves of the services of those who specialise in that particular branch of Engineering, and who may be called Industrial Works-Designers.

The subject is a very large one, full of interest and of multitudinous detail. It does not strictly come under the title of this

General Considerations.

present volume, but it is proposed in this initial section to touch briefly upon the main considerations affecting Factory Design, which, in its turn, has a very important bearing upon Factory Administration. A badly designed Factory may do reasonably well, provided it be well managed, technically and commercially. A badly managed Factory, be it ever so well designed and laid out, cannot be expected to do well. But the best results, as shown by the Annual Balance Sheet, can only be obtained from works and factories which are at one and the same time well laid-out, well equipped, and well managed.

Determination of Policy.

An industrial undertaking is essentially an investment in which it is proposed to sink, but not drown, capital. That capital may be the savings of private persons, or it may be public moneys. Nothing ought, therefore, to be allowed, either in the financial arrangements or in the design of the works, which might handicap the chances of the success of the undertaking.

Many concerns are started without reference to works design, capacity, or likely success, but with a large amount of the available capital set aside to cover some vending company, more or less suitable land, doubtful patent rights, or other overvalued tangible or intangible assets.

The first consideration should not be how much capital can be obtained, but what immediate output of the proposed product can be profitably marketed. This is a question for the very careful consideration of those into whose hands the working and success of the business is to be entrusted.

The initial output having been thus determined and some ideas having been formed as to the ultimate capacity of the Works, the data can then with advantage be passed into the hands of the Industrial Works-Designer, hereinafter for the sake of brevity called the Works-Designer.

The Works-Designer should in all cases consult with and draw upon the specialised trade experience of the manufacturer, his departmental managers and foremen, add thereto his own wider and more general experience of many industries and intimate knowledge of the science of Works Design, and therefrom work up and in due course present to the consideration of the proprietors and their officers a scheme for a well-laid out and equipped Factory, suitable for the successful carrying on of the specified trade. At this stage, the scheme should be generally complete, not overloaded with detail, embodying in plan and report the area of the site required, the areas of the several buildings and their relations to each other, recommendations as to works equipment, power

Determination of Policy.

plant, and the like, the probable sectional costs, and determining therefrom the probable capital cost of the whole scheme.

Nowadays Works-Designers are frequently called upon to supplement these figures of probable capital costs with estimates of working costs, of maintenance charges, and even of profits.

These estimates of capital and other costs are not at all easily drawn up in these early stages, but in nearly every case it is these very estimates which decide whether a new scheme goes any further or is dropped. It is of the utmost importance, therefore, that these estimates should be carefully prepared and as accurate as possible, erring if at all by being on the full side. No practice is more to be condemned than that of encouraging proprietors and investors to launch schemes upon illusive and ill-considered estimates. Careless estimating ought to be inconsistent with professional honour.

Assuming that the scheme has been generally approved, and that the financial arrangements have been made, the next step is the purchase of a site for the proposed new works. Frequently land is bought years beforehand, and the Works-Designer is called upon to fit the works to the site and to overcome the disabilities, which have probably been overlooked by the purchasers, but which would have been quite apparent to the trained mind of the Designer had he been consulted at that time. It is, therefore, of mutual advantage to proprietor and designer to have the latter look over the likely sites before purchase is concluded.

Choice of Site.

The choice of a site suitable for a given Factory or Works cannot be too carefully considered. The best plan is to first design the Works along the general lines already suggested and then look out for likely sites. In this way the real requirements will have been thought out, and much clearer ideas will be held by all concerned as to what they should really look for.

Assuming that the area required and the general works design have been determined, available and likely sites should be considered, examined, surveyed, and opened up by trial pits, if need be, to ascertain the character of the subsoil, and other peculiarities. Rough block plans of the proposed Works should be laid down on the plans of likely sites. The merits and demerits of each site should form the subject of a preliminary report, having special reference in each case to

Availability of labour, of raw material, and accessibility to markets.
Water, fuel, power, and other Works supplies.
Probable cost of land, nature of tenure, restrictions.
Probable ground charges, rates and taxes, transport rates, and the like.
Local building bye-laws and town-planning schemes affecting Works buildings, sanitary conveniences, drainage, building over sewers, etc.
Areas for storage, refuse dumping, and particularly for extensions of Works.

Choice of Site.

To overlook any one of these factors may quite well prove a serious handicap to the success of the industry. It must not, however, be supposed that sites will be found having all the desired requirements. The importance of the factors mentioned varies with different cases, so that it often happens that a disability which might render a site quite useless for one Works might be of little matter when looking for a site for a Factory to turn out some other product.

Large city, small city, suburban and country sites are available for works and factories, and it depends very much upon the trade to be engaged in as to which location offers the greatest number of advantages. Light trades may be carried on successfully in many-storied factories erected on expensive city sites, but heavier trades, requiring large areas in modern single-storied shops, must go to the suburbs or country. Whether it be one city or another city, in the suburbs or in the country, will depend very much upon the availability of suitable labour. A single industry requiring for its labour men and youths, and a greater number of women and girls, and thereby in a position to give employment to all the working members of families, would, so far as labour is concerned, be well located in or near a country village. Two or more dissimilar industries, which could together employ the workers of both sexes, could also be located in the country. It should be remembered, however, that in the country there is frequently the difficulty of housing the workers, and there is the further difficulty of keeping skilled workers in the country away from higher rate of wages and the amusements available in the towns. Generally speaking, the best Factory sites are those which are just near enough to a city to have the advantages of city facilities, such as tramcars, motor-buses, suburban or belt-railway, plenty of houses and so on, and just far enough out to escape the burden of city taxation and over-stringent by-laws. A Factory so situated will probably also have the very important country advantage of pleasanter and healthier surroundings for the workers, both while at work and in homes near by, and at the same time be easy of access to the city with its larger labour market, and consequent ability to send out more of the workers required for the said Factory, as well as take in and find employment for those members of the families for whom there is no place in the suburban Factory.

The delivery of the raw material and fuel into the Works, and the putting of the finished product into the proper markets, lead to the consideration of the location of the Factory with relation to transport of goods by rail, road, or water. Here, again, it is difficult to generalise, so much depends upon the industry involved.

Choice of Site.

The Factory has to lie somewhere between the source of the raw material and the market for the finished product. The blast furnace is usually put down near the bulkier raw material, and the finished pig-iron is sent all over the country and also abroad. Grain is brought in great quantities from North America, from Russia, and elsewhere, to the large flour mills of this country, and the products of milling are distributed to consumers comparatively near the mills. Again, a good deal of American flour is sent over to this country. Every case must, therefore, be considered by itself, and all the local circumstances have to be taken into account, when it will often be found that the side issues are really the determining factors.

Most Factories require a railway siding or connection to one or more of the great arterial railway systems, and the advantages of having such connections to each of two or more competing railways are obvious. Railway companies in Great Britain are far from helpful to the Factory owner, whether it be in the matter of installing sidings or of handling traffic. Working agreements between the erstwhile competing companies have not made matters any better from the manufacturer's point of view. The companies seem to forget that the interests of the railways and of the manufacturers are mutual and interdependent. Road transport by heavy motor vehicles is increasing very rapidly, and is being recognised by the Railway Companies as a serious competitor.

The value of canals as means of transport for raw material and finished articles varies according to the district and to the character of the goods to be transported. Carriage by boat on British inland canals is in the nature of things slow, but from wharf to wharf it is very cheap. The most useful service is obtained from canals when dealing with full boat-loads over comparatively short distances, the cost of freight per ton-mile is low, and the time taken on the journey compares reasonably with the local railway goods service. Three factors are largely against the canal service and its improvement in Great Britain. The canals are too shallow to allow of fast mechanical haulage without adding too greatly to the maintenance costs owing to damage by scour. The canals are largely in the hands and control of the Railway Companies. And the third deterrent is the steadily decreasing weight of the average load, owing to manufacturers buying in a much more hand to mouth manner than formerly, requiring small quantities speedily delivered, which is just what the canals cannot do economically.

By very many Factories, the canals alongside are very much more used as condensing ponds than as means of transport.

Choice of Site.

In looking for land for a Factory site, it is well to remember that land which could hardly grow a thistle has been known to bring an exotic price to full bloom in one night, aided only by the zephyr of rumour that some one was after the land for a new Factory. Land enquiries should, therefore, always be carried out with the utmost discretion and frequently indirectly. It is also advisable to commute certain of the land charges, while the land is yet agricultural and not subject to the higher assessments which are made upon it as soon as developed.

Special attention should be paid to the contour of the suggested site, and also to the character of its top and subsoils. A big difference in levels may involve a great expense in levelling, while a poor subsoil may demand expensive foundations for buildings and plant. An ideal site in this respect would be level, with a thin top soil, then a good layer of firm, sandy and gravelly clay, over a bed of stiff clay and marl, and with no signs of water or water-bearing strata at any depth likely to be reached with foundations either for buildings or plant.

Although it should be the aim of municipalities to encourage the establishment of industries within their boundaries, many cities and towns have building bye-laws which are either out of date or are not drawn up to permit the designer to take full advantage of modern economical Factory construction, and they make demands which quite unnecessarily increase the cost of buildings and drainage. These burdens come twice upon the Factory owner, for the greater the cost of his works the more he has to pay in taxes.

The Local Government Board has, however, sanctioned town-planning schemes whereby certain city authorities have powers, *inter alia*, to confine Factories to certain defined areas or zones within their cities, and also to grant to proprietors erecting Factories within those areas some reliefs as to bye-laws and restrictions, which could quite well be relaxed without detriment to health or general good of the community, and, at the same time, ease capital expenditure for the Factory owner.

These considerations and suggestions do not cover all the possibilities and contingencies likely to arise in choosing a Factory site, but they may serve to indicate what should govern the choice of the most generally suitable location.

With the question of site settled, the Works-Designer can draw down a still more complete general arrangement and draw up a closer estimate of capital cost, so that proprietors may be clear as to their liabilities, and both they and their officers as to the works arrangements before a penny has been spent on permanent construction.

Labour and Labour Conditions.

In every Factory there is the human element. No matter how much automatic machinery the Factory may contain, the assistance and labour of human beings will always be required in a greater or less degree, according to the character of the industry. The worker must, therefore, be taken as an essential part of the plant or process. It is only reasonable then to pay as strict attention to the efficiency of the worker as to the efficiency of the plant. In many Works, where great and constant attention is paid to speeds and feeds of high-class machine tools, there is a marked lack of attention to the conditions of labour. But, generally, it is being recognised that due consideration of and for the worker is a sound business policy and not a mere economic fad. In parallel with that movement, the law of the land is becoming more stringent in its demands for the health and convenience of the workers. Physical drudgery is being reduced by the introduction of mechanical and other aids to labour. In every way there is an improving of the conditions of labour.

It has been asserted that the increase of mechanical appliances tends to lower the standard of excellence and skill in handicraft, and consequently the intelligence of the craftsman. The statement is in a measure correct, but the conclusion arrived at is erroneous. A man is not necessarily less intelligent because he cannot produce with his hands and a few simple hand-tools, articles which, with the aid of a modern machine, he can now turn out in greater numbers, with greater perfection, finish and accuracy, and often with greater reward to himself. Quantity and quality of output can only be obtained and maintained by the combination of a skilled and interested operator working a high-class and well-designed tool. To get the best out of a worker he must be interested in his work, apart from the natural incentive of personal gain by extra pay dependent on results. Some manufacturers seem to overlook this fact and try to reduce all labour to a monotonous and weary grind, thereby imagining that they are more independent of the worker. In reality the results are lower output, probably inferior quality, and apathy on the part of the worker. Apathy on the part of the worker, whether it be due to physical or mental depression, in consequence of unsatisfactory conditions or discontent from any cause, may easily prove a far more serious loss to the management than inefficient machines.

Industrial efficiency, therefore, requires that the human and mechanical factors in the Works equipment should receive at least equal attention and be kept in repair and in good working order.

Consideration for the workers does not involve extravagance

Labour and Labour Conditions.

either in design or equipment, and, when judiciously carried out, yields a fair return.

The site and environment of the works have also a marked effect on the workers. Physical fitness is more easily secured and maintained amid congenial surroundings, which are not without their good effect upon the *morale* of the workers with the consequent benefits to the employer. There is a good deal, therefore, to be said for the transference of industries from the cities to suburban or country sites.

There are not many ideal Works in Great Britain, but where they have been established and properly carried on, the soundness and the economy of the investment have been clearly shown. Industries established under ideal conditions have come to grief in some cases, but always owing to causes other than the ideal conditions.

It may be taken as proved that there is no question of philanthropy or charity in providing for the health, comfort, content, and even the education of the workers attached to any Works; it is a policy which gives a commercial return, and is to the mutual advantage of employer and employee.

An important part is played in modern Works by the workings of the trades' unions and organisations. The subject of the organisation of labour is well worthy of careful study. It must, however, be approached with a fair mind and without that spirit of antagonism which so frequently shows in labour disputes. Employers and employees are both very apt to approach each other with distrust, each thinking that the other must of necessity be trying to gain some advantage for himself. In reality, the interests are mutual and absolutely interdependent, and the great mistake is in either side trying to domineer and best the other. Neither side can afford to be always giving or making concessions, whether they refer to wages, hours of work, or other like matters. These concessions or alterations affect the cost of manufacturing, which in turn rules the selling price, which must be kept at such a level that the manufacturer gets a fair return for his work and the purchaser value for his money, which value is again settled by other issues. It is a balancing up process all round, and, therefore, the range of alteration in any of the values is definite and settled. Generally speaking, the employees have organised before the employers, who are gradually becoming organised in like manner. With both sides organised, and with the feelings and views of individuals merged into the general opinion of the organisations, collective bargaining will be worked on better lines and in a more peaceful manner, with great advantage to both sides, as well as the general welfare of the country.

Labour and Labour Conditions.

It will be seen that, if an industrial undertaking is to bear its part worthily in the international competition, it must be the subject of very careful preliminary consideration, so that it may finally become a well-designed and well-equipped Works, properly situated in regard to its raw material and markets, having a sound commercial organisation and management, and with provisions for the welfare of its workers. Given these conditions, there may be expected willing co-operation between employer and employed, and also financial success, if the existence of the industry can be justified at all. There is almost no manufacturing industry which could not reasonably be expected to flourish, if established and run on sound lines, in Great Britain, having regard to its insular position, its geographical position with relation to the raw material producing countries, its mineral wealth in coal, the skill and cost of labour, the healthy and equable climate, and other advantages.

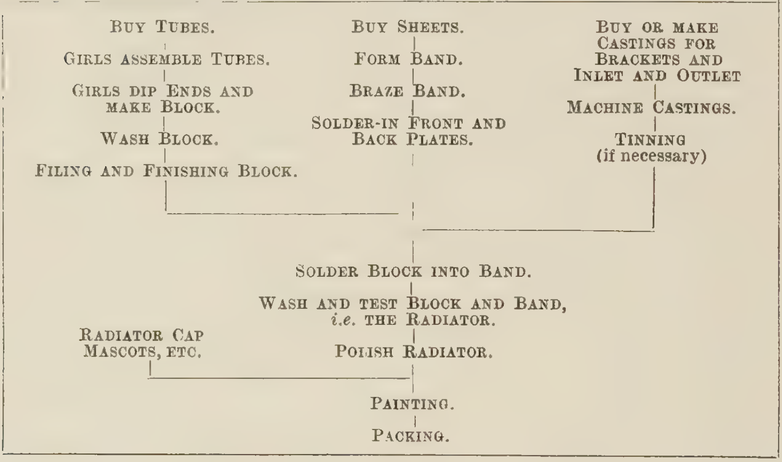
General Arrangement.

Successful general arrangement of Industrial Works presupposes practical acquaintance with the manufacturing process and with the works plant. The Works-Designer may have this essential knowledge already, but, if it be lacking, he must acquire it by carefully studying similar works and plants, either in person or through the technical press and other publications. Even if he have the knowledge, he should bring it quite up to date by studying the latest developments, much in the same way as if he were looking for the information for the first time. Further, he should consult with the men, who are to be officers in the proposed new works, partly because of their knowledge of the special requirements of the trade and partly because it is essential to have their co-operation and good will, if the Works are to be really successful. With this knowledge and his own special training, the Works-Designer should be able to construct the Works on paper, and see it in his mind's eye in full operation before anything has been touched on the site. In working up this general arrangement, the Works-Designer has to keep in view and bring along the general design of the buildings, the power plant and transmission, and the arrangement of the process plant, as well as keep in mind all the minor departments, accessories and details, which go to make a complete Works. All these details would not appear on the early general arrangements, but they must not be ignored nor thrown aside, to be placed more or less suitably later. It will be obvious that there are many advantages in having this work carried out under the direct supervision of one skilled Works-Designer, rather than by having it all split up into sections, each controlled and being worked out by separate

General Arrangement.

people, perhaps to be assembled under the supervision of the proprietors and their officers.

The Works-Designer's first step towards the actual general arrangement of the required Works should be to prepare a "process diagram," which is the enumeration in tabular or in graphical form of the several processes through which the material passes from arrival to leaving the Works. The diagram may very conveniently be drawn up like a genealogical table, which lends itself to the clear setting out of the several stages of the manufacturing process upon the components and their combination into the complete product. With a little care and thought, any manufacturing process can be reduced to this very useful form of table. An example of such a "process-diagram" is given on this page. If there be added to the diagram already mentioned, such information as the number of machines required to give a stated output, the areas of the several shops required to house those machines, and other like data, the diagram will be more complete and valuable.



EXAMPLE OF A PROCESS DIAGRAM.

Showing the several stages in the making of a Motor-Car Radiator.

Buy Tubes.
Girls assemble Tubes.
Girls dip Ends and make Block.
Wash Block.
Filing and Finishing Block.
Buy Sheets.
Form Band.
Braze Band.
Solder-in Front and Back Plates.
Buy or make Castings for Brackets and Inlet and Outlet
Machine Castings.
Tinning (if necessary)
Solder Block into Band.
Wash and test Block and Band, i.e. the Radiator.
Radiator Cap Mascots, etc.
Polish Radiator.
Painting.
Packing.

Actual Works designed to produce the same commodity on sites of varying form are found on examination to have similar essential shop areas, even though they may differ in arrangement. This suggests to the Works-Designer a relationship between shop areas and output, which ought to hold theoretically and which will be found to hold in practice, even in Works which have started from small beginnings. Of course, the application of such ratios can only be to average conditions, and the ratios will vary somewhat according to the magnitude of the output. In comparing Works,

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to obtain these ratios, the Works should be of similar periods, and any special circumstances should be taken into account. Thus, it would hardly do to compare a Works having an old machine shop, with ancient equipment, with a Works having either a new shop or the old one with new and up-to-date equipment. The newly equipped shop might be smaller than the other and yet have the greater output, owing to the greater capacity of the tools. The average percentage floor-space of four engineering Works producing similar commodities in approximately equal quantities were found to vary between $\frac{1}{4}$ per cent, and 3 per cent., as between the maximum and minimum percentage ratios for each department. The Works-Designer can, therefore, obtain an approximate formula for departmental areas in such Works. In similar manner, areas for yards, storage, refuse, and the like can be reduced to fairly accurate values. The areas should be ratios of the ultimate Works, although only the portions of the Works required for the initial output should be erected in the first instance, the remainder being left for extension. Works are put up to succeed. Success demands extension. Therefore, a well-arranged scheme of extension should form part of every original design. There is no real difficulty in making this provision, no matter how small the initially built Works. The general arrangement, and consequently the working of a Works, should become better as the extensions are made, and not worse as is too frequently the case for want of a little foresight. Before leaving this important matter of extensions, it may not be out of place to mention that shop extension by area is not necessarily in direct proportion to the increase of output sought. The output of a machine shop might be doubled by installing bigger capacity machines without increasing the building at all. Assuming that modern methods had already been adopted in a foundry, it would only be possible to double the output of the same line of castings by doubling the area of the casting floor; while to double the output of a shop building passenger rolling-stock for British railways, it would not suffice only to double the area of the carriage building shop, it would be necessary also to double and probably quadruple the area of the painting shop.

From the process diagram and the basis areas already mentioned, the Works-Designer, with an intimate knowledge of the whole process of manufacture and of the machines necessary to accomplish the process in each department, may proceed to prepare the general arrangement diagram.

The general arrangement diagram represents graphically the flow of work in process, and is probably the most difficult part of the design of Works. It involves the sequential arrangement of the

General Arrangement.

machines within each department, and thereafter the laying out of the departments relative to each other. To carry this out successfully requires great skill and care, and probably much tactful discussion with proprietors, managers, and foremen of the proposed Works. These latter officers sometimes resent the idea of an outsider having any knowledge of the requirements of their business, but it is very important that they should be drawn into the discussion, and their views as to lay-out, machines, and other matters affecting their several shops, obtained while the scheme is in its paper stages. These views are likely to be valuable, but if, on the other hand, they are out of date, the outcome of prejudice, lack of outside experience, or are in any other way unsuitable for the scheme, still they must be well discussed and their authors convinced that the Works-Designer's ideas or a compromise are better, otherwise a dissatisfied foreman will go into the shop when built and laid out, and will probably spend so much of his energy in proving that his views were right that the effects of the good lay-out will be nullified and the shop will seem to be unsuccessful.

From the detail data available, however, suitable linear dimensions and heights for buildings may be fixed, and thereafter the arrangement and rearrangement of these departmental blocks upon the site-plan may proceed until the apparently most satisfactory relative positions of departments have been secured, having regard to the disabilities, if any, of the site.

In preparing the general arrangement diagram, it may be taken as an axiom that Works should be so arranged that the material dealt with and manufactured should flow through them in an orderly manner, in one direction, as far as practicable, and without waste of time, energy, or material. In putting the axiom into practice care should be taken not to interpret " in one direction " too literally, otherwise the shops would be laid out in a long straight line. A Works so laid out might consist of offices, drawing office, pattern shop, foundry, heavy tool shop, light tool shop, erecting, testing, and shipping departments, and the departments would stand like a row of railway carriages in a train. The defects of this design are obvious; for instance, the raw material and the finished articles are dealt with at opposite ends of the Works and therefore must have a duplicate staff, the offices are out of centre for supervision purposes and far too far away from the shipping department for the amount of intercommunication which must take place, and the other parts of the Works are far from the offices, but in a lesser degree. These defects suggest the advisability of bringing the shipping department end of the Works round to the offices, the other departments lying in horse-shoe formation. The

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offices would now be in better touch with all parts of the works, in close touch with the incoming raw material and the outgoing product, while there would be no useless travelling of either raw material or finished product within the Works. The best laid-out Works will in practice generally be found to be laid out so that a turn is made somewhere in the process, with the result that the raw material enters and the product leaves the Works at the same end. The minor component processes of a complete process within a Factory may be likened to a chain which can be turned at any link. Just where the turn is made will depend on the articles being manufactured. If the finished products are bulky, it will probably be better to make the turn before or just where the smaller parts are assembled prior to being made up into the bulkier erected article. A large Works may have such turns made in the component processes. Most Works have only a railway connection or siding at one end, whereby raw material enters and finished product leaves. In those cases, the loop or turn in the process becomes a necessity.

The general arrangement diagram is complete when the several departments are arranged on paper both as regards position and dimensions. The first design is rarely final. There are always more ways than one in which the problem can be solved. A large number of block plans, each having advantages of its own, may have to be prepared, and the finally adopted plan is more than likely to be an amalgam of the leading features of several of the previous plans.

The Works Power Plant and Power Transmission have to be considered closely in parallel with the Works general arrangement. The transmission of power conveys life to the several departments of the Works, and is, therefore, an essential and integral part of the scheme. The requirements of the power transmission system may sometimes modify the general arrangement of the Works, but, in most cases, the method of power transmission will be fixed by the requirements of the general arrangements. This must not be taken to mean that the power problem can be left over till last. If that be so, it will probably be found that, instead of the Works being compact so as to permit of mechanical driving by a single steam or gas engine, the arrangements are such as to only permit of the adoption of electrical transmission and driving, which are frequently used to cover bad Works design, quite apart from the question of their general suitability for the case.

Other very important factors in the general arrangement of a Works are railway communication lines, internal transport of materials, and general auxiliary equipment.

General Arrangement.

The railway communication lines would be of standard gauge, should be simple and economical in arrangement, and at the same time adequately serve each department, provide suitable sidings, packing and storage lines, and yet maintain adequate through communication with all departments. In a large Works, the lay-out of the sidings within the Works should be dealt with very carefully, the requirements being thoroughly thrashed out, so that the essentials may be separated from the refinements. Otherwise, the sidings will be made unduly elaborate and costly, money will be spent in obtaining facilities which will be seldom used, and the general every-day working will be made cumbersome. The sidings of a Works are not called to meet the conditions of a railway company's goods yard, wherein have to be dealt with rapidly hundreds of wagons, each of which may contain quite different material or goods. The goods coming by rail into a Works yard are less in total bulk or quantity, much less diverse and for one consignee. Provisions, therefore, which may be right and proper in the railway company's goods yard may be quite unjustifiable in the Works yards. The entrance siding lines should, wherever possible, be of such strength and curves as to permit of the passage of a main-line goods locomotive to the more important sections of the Works, and where this is impracticable for want of room or land, or for other reasons, ordinary wagon sidings may be accepted and worked by horse or short-wheelbase pug-engine, according to the size of the place.

The means of internal transport may be by travelling cranes, power runways, hand runways, or by bogie trucks, with or without tracks or rails. Internal tracks for trolleys or trucks are usually of narrow gauge, 15 in., 18 in., or 24 in., unless for some special requirement of the business it is desirable to have them of standard or 4 ft. 8½ in. gauge, like the sidings. All the means of internal transport mentioned have their particular spheres of usefulness and care bestowed upon their use and selection will be repaid, since they are amongst the more important labour saving appliances within a Works.

External transport, in yards and elsewhere, other than by standard and narrow gauge railway lines, may be by overhead cranes travelling upon stationary gantries, by gantry cranes travelling upon railway tracks, by locomotive jib-cranes, by power and hand runways, and by cableways.

In addition to all the foregoing more important factors which require to be carefully considered in drawing up the Works arrangement, there is a great deal of what may be termed "auxiliary equipment" which must not be overlooked, but must be borne

General Arrangement

in the Works-Designer's mind from the beginning. Included under this heading, amongst other things, are :

Water-supply from bore-well, river, canal, or local water supply system, with probable treatment and filtration plant, for Works, boiler and drinking services.
Drainage, probably separated into foul and storm systems, the former connected to the local sewage system or to private treatment plant, and the latter, if pure, to condensing plant and cooling pond, or if that be impracticable, either to the local system or to a natural waterway.
Lighting, both for shops and yards, by electricity, high-pressure gas, oil-gas, acetylene-gas, or other form of illuminant.
Heating and ventilation for all shops, extraction of fumes or dust from certain processes.
Fire prevention service, frequently a special high-pressure water main running round the Works, and fitted hydrants, hose, etc., probably interconnected with some system of fire-alarms, automatic sprinklers, or other fire prevention appliance.
Provision of compressed air or high-pressure water for the operation of such plant as riveters, etc., lower pressure air for cupolas and smiths' fires.
Repair-shops, tool-rooms, stores, offices, sanitary conveniences, mess-rooms, cycle stores, motor garage, ambulance and first-aid rooms, and many other minor departments.

It is quite clear that the Works general arrangement is full of interesting problems and of multitudinous detail, much of which must be imagined by the Works-Designer and be constantly in his mind's eye, for it cannot all be put up on the general arrangement plans. Works designing along these lines is obviously an important subject and worthy of being carried out by specially trained and qualified Industrial Works-Designers. It is frequently suggested that works designing should be done by the interested Proprietors or their Managers. Experience shows, however, that a good manager is not necessarily a good designer of Works, even for his own trade. Every man works most efficiently when on the work for which he has been trained. Better then for the proprietors and managers only to take time from their own work to point out the requirements and peculiarities of the trade or process to the Works-Designer, leaving him to meet the requirements, and present solutions of the problems. There can be no doubt that he can, with very beneficial results, bring a fresh mind to problems, the solution of which may have become stereotyped in any given trade, and import useful ideas from other trades which have come under his wider range of practice.

Power Generation and Transmission.

The subject of power generation and transmission in industrial works has been frequently and exhaustively treated in recent years. The transactions of the several technical institutions and learned societies contain data to which ready access may be obtained. On the other hand, the mass of information there available is so technical, so varying, and so conflicting in its conclusions as to be beyond the grasp of most power users.

Tests have been made and comparisons drawn to prove the superior economy of practically every type of power plant and every transmission system, and it is true that after a full and impartial consideration, with reference to any particular works, of the relative merits of the more important transmission systems, it

Power Generation and Transmission.

may be necessary to admit that each of them offers some advantages, and decision should go to the system offering the greater number of advantages.

An interesting side issue bearing directly upon this question may be noted. The shop costs in a number of manufacturing establishments in the engineering and allied industries have been analysed, with the result that the cost for power is shown to be only from 2 per cent. to 5 per cent. of the total cost of manufacture. This is a most important point. In other industries, the ratio of the cost of power may be much greater or even less, but, in many manufacturing establishments, the influence of power costs upon manufacturing costs is so trifling as to be nearly negligible. The narrow margin may, on the other hand, mean all that there is between profit and loss to the manufacturer. These facts lend weight to the statement so frequently made, that reliability, flexibility, and adaptability to the needs of the worker are more to be sought after in a transmission system than simply economy of operation. It is certainly true that in most works, a very modest reduction in the labour costs, due to increased manufacturing facilities or stimulated output, may quite easily be equal to the power cost. The expansion which has taken place in the applications of electricity in industrial works has further proved that this aspect of the case exercises an important influence on the minds of manufacturers. There are many electrical installations which could hardly be justified on any other grounds.

Certain manufacturing processes have features which have a direct bearing upon the question of power generation and transmission. Iron and steel works have so-called " waste gas " and " waste heat " from which power may be obtained ; collieries, large quantities of low-grade fuel and filtered washery liquor or coke oven gas ; saw-mills and carriage and wagon works, a quantity of timber refuse and exhaust steam from smithy hammers ; while in other classes of factories, bleach and dye works, chemical works, sugar works, etc., the demand for steam for the manufacturing process may exceed the demand for steam for power. A decision, therefore, on this question of power generation and transmission demands the consideration of all the several forms of generator and motor, before any conclusion can be come to, as well as of all the features and possibilities of the works themselves, and, further, this consideration of the question must be impartial. To compare an antiquated steam-driven shafting system, which has just been superseded, with a high-class gas-driven system, which has just been installed, is only of value in that it indicates the saving effected by the introduction of modern power plant. A few years ago

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there was a boom in gas engine plant, and gas engines were placed in scores of works with the minimum of consideration of the works' requirements. Now, the traveller for gas engines is being largely ousted by the traveller for electric motors, and there is a boom in the installation of electric motors, in many cases with as little consideration as in the case of the gas engine. Nothing could be more prejudicial to the best interests of the electrical industry, an industry in which all engineers are intensely interested, than the thoughtless manner in which electricity is often adopted for industries where even brief impartial consideration would raise doubt as to its entire suitability. Partisan figures and statements are presented to probable purchasers, and they are thereby led to adopt plant through having been unable to discriminate between what was reliable and what was misleading.

The following general statements may not be new, but they form an essential part of the subject and cannot be ignored. Like all generalisations, they are subject to modification under particular circumstances.

The first conclusion, and that to which it is difficult to reconcile the partisan mind, is, that each system of power generation and transmission has its particular advantages and superior economy, and that maximum economy in works driving in a particular case may be obtained by a combination of two or more systems. The difficulty is usually not so much the selection of the system, as the determination of the extent to which it should be utilised.

Dealing first with transmission systems. Where the plant is compact and conveniently arranged within a radius of, say, 100 or 150 feet from the central power plant, mechanical transmission is most economical, while, with an increased radius, gas or electrical transmission has advantages, gas being the most enticing system from the point of view of thermal efficiency, but meantime having a more limited application. It follows therefore that, in small works and factories, the most careful thought ought to be given to the works design in order to insure a compact arrangement and efficient mechanical transmission.

Where tools are set widely apart, electrical transmission with independent motors is economical, although where it is possible to have a group of tools in a works, an independent gas engine or electric motor driving these through shafting or other gearing is more economical than independent motors.

Where the amount of power required for individual machines is small, it is almost always advisable to group them. That this conclusion is borne out in practice will be seen by examining the more recently published descriptions of the electrification of several

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large engineering and shipbuilding establishments. From these descriptions it will be found that the average size of motor is steadily rising.

The question of reliability and consequent need for stand-by plant is also important. Practically any one of the systems, if properly installed, can be regarded as reliable, but the sub-division secured by the use of motors or small gas engines has advantages, in that the failure of one unit does not entail total stoppage of the works.

The chief advantages of the electrical transmission system are its adaptability and the ease with which it can be extended, and its chief drawback is its cost, a part of which, at least, is due to the refinements which have been introduced into electrical controlling and operating mechanism, and to the ever-increasing stringency of Home-Office and like regulations.

The regulations referred to are doubtless in a measure necessary and desirable, but there is a tendency to make them too finnicking and irritating, so that they become a hindrance to the application of electricity. What is really required is some form of national control over the municipal and public supply companies in so far as would obtain greater uniformity in supply voltages, phases, and periodicity throughout the country. Greater uniformity in these essential details would not stifle individual effort, but keep down fads and secure continuity of policy, and would greatly assist in standardising motors and other electrical gear, thereby making for the cheaper, speedier, and more efficient installation of electrical plant within industrial and other works. At the same time, it would remove any excuse there may be for some of the more or less objectionable forms of municipal trading to be found in connection with electrical power supply.

The question of power generation, like the question of transmission, depends for its solution upon the conditions of service. Where the power demand is very intermittent, purchased electrical energy has advantages over all other systems, although for dock pumping, slip-way haulage, and other heavy intermittent loads, gas engines, using town's gas, are very economical in use. For a moderately steady demand up to about 100 to 150 B.H.P., the suction gas engine has no rival. Above this load it is possible to purchase steam plant using highly superheated steam, which can generate one I.H.P. per hour, at a fuel cost of little over 1 lb., and a steam cost of approximately 8½ lbs. per I.H.P. Such plant is, however, uncommon, and until it becomes more general, the range of usefulness of the suction gas engine may be said to rise to 150 to 200 B.H.P. Above this limit, steam plant, using low-grade fuel, has

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advantages which have been greatly enhanced by the recent advance in the price of anthracite. Indeed, the position of the steam engine or turbine for single-unit plants of over 200 B.H.P. is not seriously assailed, except where the main question is complicated by side issues or where the cost of coal is well above the average. The advent of the geared turbine is a most interesting and pregnant development.

Where an electrical transmission system has been decided upon, the purchase of current demands first and most careful consideration. If a private plant is decided upon, then the generators may be either steam or gas engine driven. The units in the case of gas engine driven generators may be of practically any size, while steam engine driven units may be reciprocating engines up to 750 KW., and steam turbines thereafter. Interesting results can be got from the combination in series of high-pressure reciprocating engines with low-pressure steam turbines and condensers, a combination which gives a wide range of economical load at a modest capital cost.

The sphere of usefulness of the large power gas engine is confined mainly to situations where so-called waste gas can be obtained, as at coke ovens and blast-furnaces, or where chemical recovery plant is already installed.

The side issues in works' power plant also require consideration. The utilisation of exhaust steam in turbines, of blast furnaces and coke oven gas in large power gas engines, and the development of the storage battery in connection with the fluctuating loads in large Works, are all problems of remarkable interest, but the detailed consideration of them is beyond the scope of the present volume.

Design and Construction of Works Structure.

The buildings of a factory, whether brand new on a new site or reconstructed, should be laid out with great care and skill with relation to the process to be carried on within them. It should be possible for the material to pass through the various processes, with the minimum of handling and labour, with room everywhere for adequate and comfortable working, yet without waste space and useless corners. The buildings themselves should be quite secondary to the requirements of the process; they are after all but the shell or body housing the soul or life. In this country, too many factories are planned, chiefly with relation to the site or an ornamental façade, and by designers who cannot be expected to appreciate or to have adequate knowledge of the requirements of the process to be housed. They are designed from the outside to the inside, whereas all industrial buildings, if not all buildings, should be designed from the inside to the outside. Works buildings

Design and Construction of Works Structure.

should be designed in the first place to withstand the special stresses, both external and internal, to which they will be subjected in service, and effectively and economically house the machinery and power transmission plant. For this reason, the design of industrial works and factories, in all its details, ought to be left to the Works-Designer, with the proviso that he is not at liberty to perpetrate an offence to the public eye. The essential feature of all industrial design should be simplicity, utility, and efficiency, combined with low first cost and durability. These features should be apparent, whether in the design of the power plant, of the electrical installation, or of the structure. The simplest manufactured details readily procurable from stock ought to be used for all details, unless these are quite unsuited to the purpose of the designer. Steel structural work, even more than builders' work, ought to be characterised by simplicity and well-placed material. Artistic or eye-pleasing effect can always be obtained by correct design, carried out in suitable materials on well-balanced and simple lines, carefully arranged and well-proportioned, without useless and meaningless ornamentation. Nothing can be truly artistic nor eye-pleasing which violates the principles of design, or misuses material.

A fully qualified Works-Designer should be able to carry through all details of buildings, plant, and equipment. Should he be deficient in the necessary knowledge of architecture, there should be associated with him an Architect, experienced in Works buildings and willing to co-operate with and meet the requirements and limitations imposed by the Works-Designer.

The whole character of industrial structures has changed to a marked degree in recent years. Formerly, works had massive stone walls and timber roofs. To-day, the steel structure has displaced the older materials almost completely. In factory construction, reinforced concrete is coming more into use, and some very beautiful structures have been erected in reinforced concrete with brick-filling. This class of construction, especially where brickwork is also reinforced, is particularly satisfactory.

The question of economy in first cost is important, but may have greater influence on the class of construction than is warranted, and may even lead to the adoption of timber. The cost of maintenance and the fire risk with the ordinary form of timber construction, combined with the relatively shorter life, are strong influences against its adoption. Granting, however, that an all-timber, or brick and timber structure is lowest in first cost, then an all-steel construction, with corrugated iron sheeting is next in order, while brick and steel construction is usually rather more expensive.

For a permanent factory or works, however, where a manufac-

Design and Construction of Works Structure.

turing process is to be carried on under shelter, a steel structure with brick walls, either built or filled, is almost universally used. A metal-covered steel construction is again almost universally adopted where the manufacturing process is of such a nature that absolute protection from wind and weather is not of first importance.

The first important influence operating towards the remodelling of industrial buildings can quite safely be said to have been the introduction of electricity. The ease with which electricity can be generated and distributed has influenced the erection of works with less consideration for concentration of the driving arrangements, and with greater consideration for suitability to the manufacturing process. Again, the development of the travelling crane has had a marked effect in altering the character of engineering and other works establishments.

With travelling cranes and shafting, the consideration of internal stresses is important, because any excessive movement in the structure will bring about shafting troubles, and any lack of rigidity may quite easily have a serious effect upon the operation of travelling cranes. The stresses due to the stopping, starting and running of high-speed travelling cranes are very considerable. A point frequently neglected, in designing sheds where cranes are in use, is effective diagonal bracing of the structure to prevent racking through end travelling on the one hand and crane travelling on the other.

The external forces to which an industrial structure may be subjected are wind and snow loading. Generally speaking, if a structure is designed to resist the side and roof stresses from wind loading, and to have a fair margin of safety, any snow loading which may arise in this country can be neglected.

In buildings in which there are cranes, the area between the main pillars and under the crane beams should and may be left quite clear, since if the pillars are stiff enough, and their strength is carried through to the top of the crane beams, and if, in addition, a moderate amount of diagonal bracing is introduced above the crane rail level, then the upper part of the structure between the crane and roof girders virtually becomes a deep lattice, having the crane girder as its lower member, the roof girder as its upper member, and the continuation of the pillars carried up to take the roof as its end members, the lattice bracing filling the intervening space. With such a structure, the resistance to the heavy stresses set up by the travelling cranes is usually well provided for. In general with long spans, if bracing is carried down in a vertical plane from the lower member of the roof tie to the roof pillar, and sideways in a horizontal plane from the same lower

Design and Construction of Works Structure.

member to the roof girder, these diagonal connections tune up the whole structure in a reliable manner.

The detail design of industrial buildings is as interesting as the design of power plant, and contains as great an amount of detail. Apart from the provisions for travelling cranes, already mentioned, preparations have to be made on the structure for pillar cranes, shafting, the passage of electric cables, heating pipes, high and low pressure water pipes, compressed air pipes and many other accessories. The natural and artificial lighting and their relation to the manufacturing process all the year round have to be kept constantly in mind. While some manufacturing processes require that any number of special preparations be made upon the works structure in course of construction.

The standard types of construction in this country are roofs having equal pitch of approximately 30 degrees, and the saw-tooth roof. In America very much flatter pitches are in general use, and on the Continent designs having two pitches are common. In America, shafting, and even motors, are frequently suspended from the roofs, the principals of which are usually much heavier than in our practice. No doubt this practice will develop with the spread of electrical driving in this country. A little license may be dangerous, but it is always quite desirable for a roof to have a sufficient margin of strength to permit workmen, under certain circumstances to take a light lift from a plank put across the roof principals, and that where cranes are not provided, the roof may be locally and permanently stiffened to take special recurring but infrequent lifts.

There seems to be an increasing tendency to use the saw-tooth or north-light roof for machine and other shops. It should be borne in mind, however, that this roof originated in the low weaving sheds, where, with the eaves at from 10 to 14 ft. from the floor, the roof lighting was very satisfactory. With a greater eaves height, the lighting becomes less satisfactory, as the direct light from the glazed side is thrown into the next bay through shafting and belting, and is in a measure lost. Flattening the angle with the horizontal made by the glazing improves the lighting, but, in any case, saw-tooth roofs are disappointing in lighting when the eaves are over 20 ft. above the floor. Further, this form of construction becomes unduly expensive on spans over 30 ft.

The all-timber roof construction, known as the Belfast roof, has been a great deal used in some Works, chiefly because of the low initial cost for large spans, while in some cases, reinforced concrete roof trusses, triangulated like steel trusses, have been used under special circumstances. Flat reinforced concrete roofs have advantages, where fireproof construction is required, and where another storey may be built later.

Design and Construction of Works Structure.

Factory floors are frequently spoken of as if they were amongst the minor details. Far from being so, they are very important from the points of view both of capital cost and Works efficiency. There are very many types of floor construction, and as each offers some advantage either in cost or desirability and suitability, selection is often very difficult. Sometimes the process to be carried on in the Works settles the type of floor, as, for instance, a wet sloppy process cannot be carried on over a wooden floor. Concrete floors are cheap, but are very tiring for men to stand upon, are dusty, and unsuitable for machine shops, where tools may be dropped and finished parts of the manufactured product must be laid down. Concrete with timber top, in form of battens or wood blocks, is more expensive, but in every way better from a Works' point of view. Creosoted timber on ashes may be used for covering large areas, such as wagon building or constructional shops. There are many other types suitable for ground and upper floors, but sufficient has been said to indicate that floors, which may cost from 3s. to 10s. per square yard, cannot be treated as minor details.

There are a vast number of other interesting details, arising in connection with Works buildings, and which lend themselves to discussion and consideration. A few may be mentioned. Roof-glazing, side and end coverings where the frame of the structure is steel, design of brickwork for outer walls, details of purlins, lattice purlins, ventilators, gutters and downpipes, tool rooms, stores, lavatories, men's rooms, offices for foremen and others, heating, lighting and ventilation, and many others which present opportunities for thought and design.

Consideration of Plant and Equipment.

Plant and equipment in this case mean the special tools or process plant required for the manufacture of the product of the works or factory. Obviously little can be said in a general way upon this subject, as every trade or business requires plant to be selected to suit it. The design or the selection of plant for any works comes within the scope of the operations of the Works-Designer, but here, more than in any other part of the works, is it necessary that he should collaborate closely with the proprietors, managers, and foremen, and be quite clear upon the requirements, so that specifications, enquiries, or even designs may be so drawn up as to get the best machines available for the purpose to be achieved. The Works-Designer should be able to sift out old-fashioned ideas, prejudices, and lack of width of knowledge on the part of those with whom he is collaborating, and should remember that they have

Consideration of Plant and Equipment.

been brought up, in many cases in the one trade or business, and have probably an outlook confined to that trade and its usages. To them comes the Works-Designer, with a wider, if less specialised, knowledge of the requirements of many trades as regards plant and equipment, and the ensuing discussions are of great advantage to all parties, and make for progress. The disposition of the plant upon the plans of the several shops is always a difficult matter, and one requiring a great deal of care and patience. It is so easy to waste shop room, and therefore money. It is equally easy to so cramp the machines together as to slow down the output, owing to difficulty in moving about and in getting material to and from the machines. Too much care therefore cannot be bestowed upon the arrangement of the several machines within a shop, and this care should be taken in the planning stage, particularly if the machines or tools be heavy and requiring heavy foundations. The Works-Designer will find that this arrangement upon plans or drawings comes almost naturally to him, but he will find that very many first-rate managers and foremen have not the practice necessary to follow and appreciate these small scale arrangements. It is all a matter of training, and not necessarily of superior or inferior brain-power.

In addition to the special tools and process plant, there are a great many auxiliary equipments which have to be thought out in connection therewith. Lifting tackle for getting material in and out of machines, vats, and other kinds of plant, for removing parts of the machines which are liable to break down, or which have to be removed rapidly during the process, the drainage of suds or oil from cutting machines and the supply of the lubricant to the cut, and many other like things which seem of little importance in themselves, but which go far towards economy in production.

Building and Starting the Works.

Proprietors are seldom willing to allow sufficient time for the proper maturing of the whole scheme, before they wish to see work being carried out upon the site and buildings coming into view. This policy always results in a disappointing slack time later on in the operations, while frequently something is done hastily which it is found would have been better done in some other way or arranged differently in the light of the further worked-out plans. The changes of mind and ideas should be made in the drawings stage, and in this stage all conflicting opinions, of which there are sure to be many, must be reconciled. Time spent in thrashing out the scheme on paper is easily made up in the speedier execution of the work without alterations, and it should be remembered that the alteration of a drawing is both simple and cheap compared with altering, say, the position of a building after it has reached even the dampcourse.

Building and Starting the Works.

The actual carrying out of the work on site, involving the levelling of site, the buildings, and equipment generally, is best carried out by a series of contracts by specialist contractors all working under the plans, specifications and supervision of the Works-Designer. Everything is then coming under the eye and notice of the Works-Designer, who can dovetail one contract into another, by bringing on the later-required contracts while the earlier ones are being carried out, and so ensure continuity of effort and policy.

The starting up of a new works is a most anxious time for everyone concerned, and calls for everyone's best efforts and co-operation. There is new plant to be started on all hands, frequently transfer of staff and plant to be effected, men to be put on to and instructed in new duties, and no matter how well every thing would appear to have been arranged and thought out, there is almost sure to be trouble in a greater or lesser degree with both men and plant. However, even the difficulties of starting up a new works will be overcome, and the Works-Designer can devote time to the important duty of adjusting, amending, and certifying the Bills of Quantities and accounts for the several construction contracts, and in supervising the guarantee tests upon power plant and other parts of the equipment.

Reconstructions of Existing Works.

In an old country such as Great Britain, it is obvious that, although there will always be a number of new works and factories to be built, there will be a far greater number which require modernising to meet present-day conditions. Many important industries have begun in small works, which have been added to year by year as circumstances demanded. The resultant works are, almost without exception, lacking in any definite scheme in their layout, and are consequently ill-adapted to meet the severe competitive conditions of these days. In some cases the plant is also old-fashioned and out of date; in others, it has been brought more or less along with the times, but is not giving its best return owing to the defects in the layout and housing.

This state of affairs will require to be very much altered during the next decade, if Great Britain is to hold her industrial supremacy. She is competing in the open markets of the world with the manufacturers of nations, which started later, are therefore more up-to-date, and who are pushing for all they are worth for the advancement of their own industrial interests.

Many British manufacturers do recognise the needs of the case,

Reconstructions of Existing Works.

with the result that there are some very fine and very efficient factories in this country. Many, however, and they are by far the greater number, do nothing, because they cannot see their ways to build a new factory upon a new site. They forget that careful reconstruction should lead to a new factory upon the old site. Others spend large sums year by year making impulsive alterations, following the line of least resistance at the moment and with just the immediate want in view, with the result that their works become as much patchwork as before, but in newer materials.

The reconstruction of existing works is quite as important as the building of new works, and is really the more frequent problem presented to the Works-Designer. The work to be done is similar to, and the manner of doing it is very like that already described in connection with the design of new works, but there are added difficulties. The reconstruction scheme is usually dominated or hampered by some existing building or arrangement, which cannot be removed or altered, and so becomes the basis of the scheme. Further, a reconstruction scheme has usually to be carried out without stopping the works. This latter requirement means that a well thought out scheme has to be drawn up and agreed by all parties as to how and when the several sections of the reconstruction scheme can be and are to be carried out. It will be obvious that the details of the reconstruction scheme itself may quite well be affected by this development scheme.

When it is decided to add to, alter, or re-arrange an old works, a broad scheme of reconstruction should be drawn up and embodied in drawings and reports, for the works as a whole, even although there be no immediate intention of erecting more than, say, one shop. This will enable the reconstruction to be carried out piecemeal, as finances or opportunity allow, and will ensure that the final result will be an orderly and well-arranged works, which will be a vastly improved asset.

The process of works-reconstruction is more difficult than building anew out in a field. It is slower, but for that very reason the expenditure is spread over a longer period, and may even be met out of revenue. This consideration alone should lead more manufacturers to reconstruct their works and factories along the lines suggested. It is, however, an unfortunate fact that comparatively little is being done, although there are signs of a movement in the right direction, together with appreciative recognition of the science of Works Design.

A. H. M.

SECTION II

GENERAL ADMINISTRATION

Staff Organisation.

Section **II a**

Staff Functions.

STAFF organisation is perhaps the main problem of general administration.

Speaking of limited companies, that is, limited as to the liabilities of the shareholders under the Companies Act, all administrative power is vested in the Board of Directors, and these powers are delegated according to circumstances to the various principal officers of the Company.

There is generally a managing director with supreme administrative control, apart from the Board, or there may be a general manager acting more directly under the Chairman of the Board but without a seat on the Board, though preferably always in attendance at board meetings. Various other arrangements are adopted, and in the case of a private firm, the partners carry out all the functions of a board of directors, as well as own the business.

In some cases the principal administrative officers of the Company are also directors, and may be said to bring an invaluable practical experience to bear on the general policy of the Company. There would hardly seem to be any bar to this experience being available by attendance, as required, at board meetings without any seat on the Board. Sometimes officers standing in this relation to the Board are termed technical directors, and this would seem to give a very desirable status to the heads of branch works of any relative magnitude.

The objections that are reasonably urged against administrative officers being on the directorate are the possible difficulties of getting adequate criticism of any department's working, whose chief is a director, and further there is likely to be a marked tendency for salaries generally to grow out of proportion to what would occur if the directors were unbiassed.

There are obvious arguments in favour of directors having a specialised knowledge of the industry in question, while there are other arguments in favour of men possessing broad commercial experience.

Staff Functions.

The efficiency of Boards of Directors, as regards internal administration, may easily be the reflex of the efficiency of the Managing Director or of the General Manager in regard to his use of the administrative powers exercised by him on their behalf and under their directions. In any case the efficiency of the administration generally is not readily achieved by any Board except through the officer mentioned.

In the matter of the commercial and financial policy of the Company, as apart from administration, there is room for much exercise of foresight, courage and ability. Organisation and administration will achieve little unless the general commercial policy is sound, and granted that policy is right, financial success may result despite many faults of administration.

There can be little question that the matter of staff organisation is one of the primary duties of the General Manager, apart from whether he be Managing Director or Managing Partner also, and reconsideration of the arrangements made will be necessary as often as the conditions of business change or as the staff changes.

To a certain extent it is possible to formulate an ideal plan of organisation for a given works, and having formulated the plan, to select the right calibre men for the respective positions.

The initial difficulty is to gauge the capacity of each member of the personnel. In practice the staff has to be first selected and tried, and then the organisation adjusted until each is working efficiently or proved incapable of efficiency.

There must be some sort of starting plan, whether it represent supposed ideals for the particular conditions or an adoption or adaptation of some other firm's practice within the General Manager's experience.

The very fact that each works stands alone as to the apportionment of responsibilities to each officer of the Company, makes it desirable to discuss the principal functions of the administration in an impersonal way. Some suggestions can be made, and will be made later, as to how the duties may be apportioned among the usual officers employed by any Company. The important point at this stage is to arrive at an appreciation of what functions have to be performed and to leave for later consideration who shall carry them out.

To specify a number of functions is not to imply that there should be a separate staff member for each duty specified, though that may be necessary under some conditions.

In the following diagram functions are indicated, in some cases by names that are only vaguely suggestive of the duties involved ;

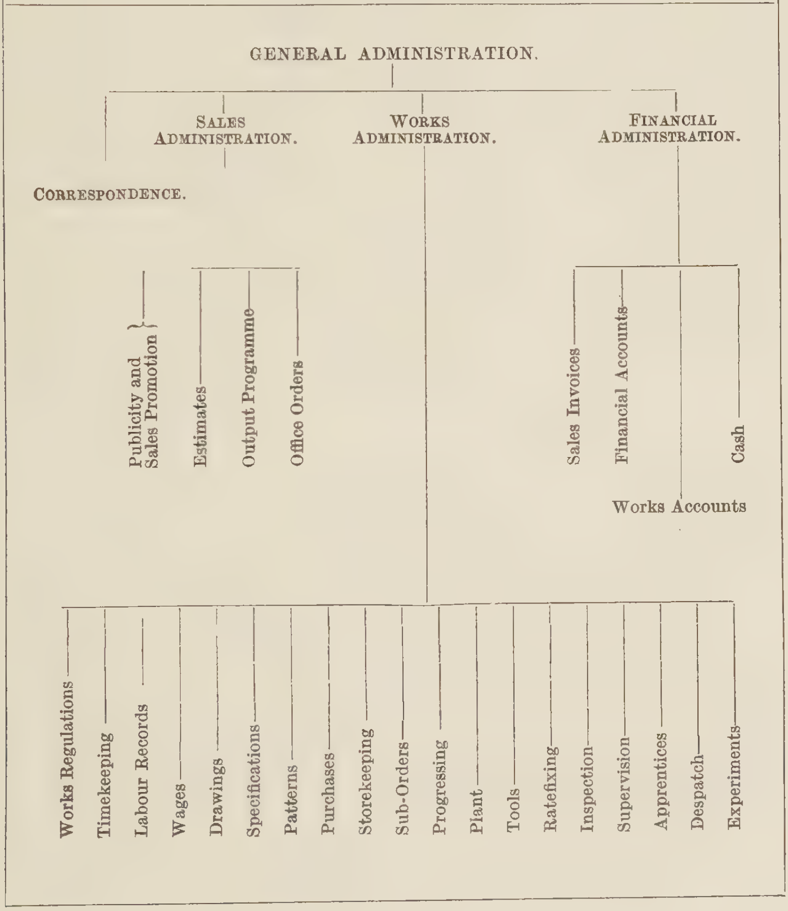
Staff Functions.

but, in every case, further discussion under each of the headings given is provided.

It will be seen that General Administration is divided under three headings of Sales Administration, Works Administration and Financial Administration, none of which, however, very well cover Correspondence as a whole, and consequently Correspondence is shown as a supplementary function of General Administration.

Works Accounts stand in a special category, being a matter both of Works Administration and Financial Administration. Their association with the latter needs perhaps to be the more emphasised, and this connection is indicated by full lines in the diagram, while the connection with Works Administration is indicated by dotted lines.

DIAGRAM OF STAFF FUNCTIONS.



Staff Functions.

Coming to the matter of the staff necessary to carry out the various functions; as stated already, this is so largely dependent on local conditions that the only suggestion that can be attempted is for some representative case.

The suggestions are embodied in a further diagram, where it will be seen that the offices of Secretary and Accountant are supposed to be held by one man, though quite usually separate officers act in the respective positions. The diagram is the simpler by merging the two duties, and designating the position that of Financial Manager.

The secretary of a limited liability company has a considerable range of duties that are peculiar to his relation to the Board, and are conveniently dismissed under the term "secretarial duties." What these duties are is largely outside the present scope, though in that part dealing with financial accounts attention is given to Share Accounts, and these will be easily seen to imply an activity that frequently makes it impossible for the Secretary to act also as Accountant. When the Accountant is a separate officer, he may be possibly made directly responsible to the Board, independent alike of General Manager and Secretary.

It is assumed for the present purpose that the Financial Manager, while immediately responsible to the Board of Directors, is also responsible to a degree to the General Manager—hence on the diagram full and dotted lines showing the relative responsibilities. This idea of responsibility in two directions may seem to be the negation of proper organisation, but the compromise is essential in practice with the more responsible officials. Its justification in their case does not, however, warrant divided responsibility on the part of the staff generally, and this is a distinction that must be kept in mind in organising staff duties.

Another dual office, according to the diagram, is that of Works Accountant and Estimator. Here again responsibilities are divided, the primary one (shown in thick lines) being to the Financial Manager in view of the latter's responsibility for financial accounts with which the works accounts are interlocked, and on which the financial accounts are largely built. The secondary responsibility (shown in thin lines) is to the General Manager.

The suggestion is that the Estimator, whether also the Works Accountant or a separate officer, should be invaluable in supplying the General Manager with the data necessary for dealing efficiently with the sales propositions on the one hand and production possibilities on the other. The theoretical objection to one man serving for the preparation of both estimates and works accounts is the possibility of him making the cost accounts square with his estimates.

Staff Functions.

This risk is not likely to be worth consideration if the man is fit to hold the position at all.

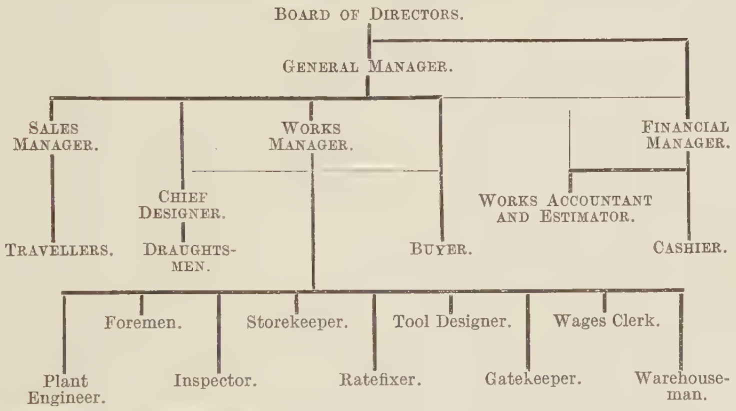
The functions of the Works Accountant will be found to be very wide, and it is very desirable that he should be qualified to bear an independent responsibility.

Sometimes the duties of a Chief Cost Clerk approximate to those advocated for a Works Accountant, and there may be no material difference between the two beyond that of name. On the other hand, it is argued that the Works Accountant ought not to have been trained wholly as a clerk, but ought really to be an engineer who has fitted himself for works accounting duties.

It is deliberately suggested that the opportunities attaching to such a position as this for estimating, organising and administrative work in relation to works efficiency should make it both attractive in itself, as to status and remuneration, for a trained engineer with a bent for the commercial aspect of production, and should also afford an excellent training for even more responsible posts.

Given the technical qualifications, a works accountant might quite easily be able to act as an efficiency organiser.

REPRESENTATIVE STAFF ARRANGEMENT DIAGRAM.



To simplify Diagram assistants are not indicated.

Another officer whose responsibilities are likely to be divided is the Chief Designer, more ordinarily called the Chief Draughtsman, as between the General Manager and Works Manager.

In some cases the Chief Designer, called then more appropriately the Chief Engineer, is the officer controlling or partly controlling the Works Manager, and therefore the production, rather than the

Staff Functions.

other way round. There is a great deal to be said for this arrangement under suitable conditions, more particularly as to personnel. In the majority of cases, especially where manufacturing, as distinct from engineering, obtains to the greater degree, it is likely to be better that the Works Manager is the more qualified officer. Following this view, the Chief Designer is shown with primary responsibilities to the General Manager, and secondary responsibilities to the Works Manager. It is certainly of considerable importance that the Works Manager's recommendation as to design, especially in relation to production, should carry proper weight with the Drawing Office.

As regards the Buyer, so far as his duties are technical, there is little doubt of his work properly coming under the Works Manager, but, in its purely commercial aspect, buying is rather a matter for the General Manager.

Very often, and it may be said much too often, the Buyer has little or no technical qualifications and he is then really a special clerk, able only to use a very limited discretion in the placing of orders.

Buying in properly trained hands is a far reaching factor in work efficiency by its influence on both design and production.

There may be good enough local reasons for buying to be placed in the hands of a clerk, but this course does not make usually for efficiency. A capable clerk can of course do useful work in learning the sources of supply and obtaining competitive quotations.

The art of buying involves more than an acquaintance with trade commercial practice. It should involve an intimate knowledge of trade processes and alternatives together with a keen outlook for demonstrated technical possibilities.

The Buyer should be not less alive to future requirements than the Chief Designer, while certainly there cannot be too close a co-ordination between design and buying. For these reasons, both sections may be associated under the same control as production, viz. that of the Works Manager, though it should be enough if the responsibility to the Works Manager is secondary to that to the General Manager. The diagram shows matters in that way.

To suggest this is to raise the question as to the Works Manager's qualifications for controlling these matters. It is enough to say that if a Works Manager is only capable of looking after production, he is rather a works superintendent than a manager ; but there are capable Works Managers who are not allowed to really control either design or buying. The capacity, experience and character of the General Manager in power usually regulate the scope of activity afforded to the Works Manager.

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However valuable the Works Manager's influence might be in regard to design and buying, the organisation of the works proper may be too incomplete to allow him to divert any part of his attention from production without grave risk to output.

Relatively few works managers are experts in management by training, though some are highly successful by virtue of natural judgment, adaptability, capacity for handling men, and strength of character. Others, again, are credited with success by reason of their good fortune in being associated with a company whose commercial and financial policy is notably good.

The more works organisation is resolved to a science, the more will works managers be capable of far greater things by starting with a proper knowledge of how to control without laborious absorption in detail.

The Institution of Mechanical Engineers are recognising that works organisation is something to be learnt by an engineer as part of his training for responsibility, by admitting the subject in the examination for associate membership. The first of these examinations was held in October, 1913.

Granted all these possibilities in the way of administrative control, which, if fully developed, would make him almost a general manager —a position indeed to which success as a works manager commonly leads—due consideration must be given to the outstanding necessity for the Works Manager to have the natural ability to handle men, both workmen and foremen. Without this ability, which is hardly to be acquired by merely taking thought or by any mechanism of administrative organisation, all efficiency in other directions may be brought to nought.

The fact that this psychological intuition is called for in only lesser degree from foremen, suggests that a works manager ought to have proved his ability as a foreman before taking the higher position. This is not a usual method of progression in this country, though it is likely to extend with the continued advance in the present-day type of foremen. The period that the average embryo works manager spends in a Drawing Office does not always place him, as regards designing ability, at very much advantage over a man with larger shop experience and presumably equal technical training. The premium pupil with an experience of sorts in different works departments, followed by a period in the Drawing Office, and later, perhaps, testing and inspection experience, ought to arrive at the position of Assistant Works Manager with a wider outlook—sufficient possibly to fit him in due season for full responsibility. Alternatively the man who can proceed by way of the Drawing Office to estimating and ratefixing, and thence

Staff Functions.

as shop chargehand and foreman, might be expected to miss the Assistant Works Manager's stage and arrive at full responsibility with a knowledge of workmen likely to serve him in great stead, provided always that he has the temperament both to learn and apply his knowledge with a shrewdness that does not lack sympathy.

In discussing the main elements of works management, as is done in Section III e, Production Efficiency, it will be observed that ratefixing, progress work and inspection are deemed to be distinct from Supervision. That this separation is right is recognised in many works already.

An endeavour is being made by some managers to split up the foreman's duties to a greater degree than is indicated here.

The day of the omniscient foreman is passing, and works management has now to concern itself with co-ordinating the work of various specialists, each carrying out some phase of the old-time foreman's duties, but in a much fuller way.

Supervision remains the particular province of the foreman, and in that it is for him to become a specialist. In meeting the change of conditions in that spirit he need fear no competition or feel any resentment.

From what has already been said, it will be appreciated that supervision is not summed up in the mere exercise of authority, but rather it is the handling of a body of men to get efficiency without strife. It almost goes without saying that efficiency and strife cannot exist together, while, on the other hand, it may be virtually impossible to reach efficiency without preliminary strife—in this, efficiency may seem to be bought at too high a price, but that argument will not fend off the economic results of not being able to meet competition. The efforts of workmen are not unnaturally directed towards getting more money for doing less work, and it is an ever-present problem as to how to hold this tendency in check, without involving the wasteful retort of strikes, wasteful alike to both parties. It is a very understandable virtue of the premium system that it offers the opportunity of more money for more work—a condition of existence that should unify the interests of employer and employed.

Much prejudice, and understandable prejudice too, remains to be overcome before all foremen will admit the possible gains in efficiency that may result from the specialisation already indicated.

An incompetent ratefixer, for instance, will probably be more detrimental to the shop efficiency than an overburdened foreman, but that only means getting a competent ratefixer.

Good ratefixers are no more plentiful than good foremen, and the best proceeding is usually to select a well-trained and educated mechanic of fairly wide experience, and afford him the opportunity of teaching himself the art of ratefixing. Here, again, the schools will some day teach the elements of ratefixing as they do of machine drawing. It may be that keen young engineers of adequate practical experience will forsake the drawing-board for the opportunities that may lie in ratefixing. **Staff Functions.**

Similarly with Progress Work and Inspection ; these are functions calling for technical training and should be recognised as worthy work for engineers who aim to become Works Managers.

Staff Control. The selection of staff obviously calls for the utmost care, particularly as staff appointments should carry with them a sense of reasonable security of employment.

The fear of unemployment is a very real factor in sapping initiative, and this fear is intensified by the attitude of many prospective employers towards applicants who are out of employment. There are employers who immediately discharge any member of the staff known to apply for a berth elsewhere, so that it takes a rare courage for some men to find the niche to which they are best suited.

In selecting new men consideration must needs be given to the strength of character of the applicant, and a clean bill of good behaviour is, in a measure, only a negative virtue. The real virtues from which the staff derives its strength are positive ones of initiative, ability and loyalty.

Loyalty is the key to staff efficiency, and requires to be assiduously fostered by consistent fair play. Want of care in selecting new staff and want of courage in weeding out obviously inefficient staff seriously militate against the proper spirit of loyalty.

Applications for staff employment should be set out on a prescribed form to ensure full details being supplied and to allow of fair comparison. 5-1.

Junior help may with great advantage be subjected to some simple form of competitive examination, and there should be in operation a definite scale of pay while on junior duties.

While an apprenticeship scheme in the ordinary sense is not applicable very well to staff duties, yet every boy should be considered as a learner, to whom advancement of work is as important as advancement of pay. Trouble taken in selecting and training juniors will result in better material for the adult positions and stronger loyalty.

The Management should give facilities for Journal Clubs, whereby the staff may take the greater interest in the industry in which they are engaged.

Staff pay must take cognisance of the quality of work done as

Staff Control. well as the quantity. If an employer cannot give adequate promotion to a deserving man he ought not to hinder him trying to obtain promotion elsewhere rather than, in a tyrannical spirit, expect to be able to stand permanently in the man's light. The risk of losing good men must be met by having sufficient good men in the staff in training, and adequate stimulus may discover enough good men among the rank and file.

The organisation and consequent recognition of each man's duties makes for discrimination as to individual merits, and lessens the disadvantages of staff changes and absences.

The plan of occasionally changing duties round so that more than one man may be familiar with each duty, is quite sound, and forces the establishment of a carefully organised routine that will not easily suffer in occasionally fresh hands.

Coming to the question of departmental heads or administrative officers, the spirit of the Management in its intention to deal with the staff may be rendered wholly abortive if the Departmental Head is petty minded. There are men in position occasionally whose instinct of self-preservation induces them to discourage any initiative in their staff, and at the worst to take credit that may belong more properly to the men under them.

This instinct is not unnatural, but its operation can at least be largely obviated by taking care to appoint only men to office whose merits have legitimately won recognition and whose reputation as to ability is established on firm ground, and also by taking steps to give a sense of security to each appointment to a greater degree than may be possible with the less responsible staff. To this end the interests of Departmental Heads cannot be too closely identified with those of the Company. This can best be done by a bonus calculated on the profits of the year. In some cases bonus is paid quarterly to all the staff on the estimated profits and adjusted at the end of the year. Experience shows this plan to produce very good results amongst the general staff, but not so satisfactory with the works staff, other than the stores.

The following is a specimen of a staff agreement. The length of engagement is usually for a minimum of three years, which is perhaps as long as can be wisely undertaken by either party.

MEMORANDUM OF AGREEMENT made the day of One thousand nine hundred and BETWEEN whose registered office is situate at In the County of (hereinafter called "the Company") of the one part and of in the County of (hereinafter called "the Officer") of the other part.

WHEREBY IT IS AGREED as follows:—

1. The Company hereby engage the said Officer to be on the staff of the Company and to hold the appointment mentioned in the Schedule hereto. As the holder of such appointment the said Officer shall perform the duties and exercise the powers which from time to time may be assigned to or vested in him by the Directors of the Company, short particulars of such duties being set out in the Schedule hereto.

Staff Control.

2. Subject as hereinafter provided the said Officer shall hold the said appointment for the term of years from the date mentioned in the Schedule hereto. During the said term the said Officer shall, unless prevented by ill health, devote the whole of his time, attention and abilities to the business of the Company and shall obey all the lawful orders and instructions from time to time of the Board of Directors of the Company, and in all respects conform to and comply with the directions and regulations given and made by them, and shall well and faithfully serve the Company and use his utmost endeavours to promote the interests thereof.

3. The said Officer shall be entitled to such reasonable holidays as may from time to time be agreed upon between him and the Company or the Directors thereof.

4. The said Officer shall not divulge or communicate to any person or persons any information which he may receive or obtain in relation to the business affairs of the Company or the working of any invention or process which is carried on or used in the Company's works, and will at all times afford to the Directors and all other persons entitled to demand the same full explanations as far as may be in his power of all matters affecting the Company connected with his said appointment.

5. Whilst the said Officer shall continue in the employment of the Company, he shall not carry on, or be concerned in the carrying on of, or in any way be interested (except as a Shareholder or Debenture holder) in any business other than that of the Company, without the consent of the Directors of the Company in writing.

6. The said Officer shall be entitled to the salary mentioned in the Schedule hereto, such salary being payable monthly, and in addition to such salary he shall be entitled to payment, in respect of each financial year of the Company, to a percentage on the dividend declared on the preference and ordinary Shares of the Company in such financial year as mentioned in the Schedule hereto. Such percentage shall be payable at the same time as the final dividend for each financial year shall be distributed among the Shareholders of the Company, and in respect of the financial year ending on the Thirty-first day of December next the said Officer shall be entitled to a proportionate part of such percentage or share of profits calculated from the date of this Agreement. If this Agreement terminates before the end of any financial year, or for any reason (except those set out in the last part of clause 8) the Officer leaves before the end of such year, the Company shall pay him, at the same time as the final dividend for that year is distributed, a proportion of his said percentage calculated from the First day of January preceding the termination of this Agreement.

7. Either of the parties hereto may terminate this Agreement and the engagement of the said Officer at any time after the expiration of the said period of his appointment by sending to the other of them at the last known place of abode or business of such other party calendar months notice in writing, and at the expiration of such notice this Agreement and the said engagement shall determine, but until so determined this Agreement shall continue in full force.

8. If by reason of ill health, accident or otherwise the said Officer shall be incapacitated from attending to business for three calendar months consecutively, the Company shall be entitled to discharge the said Officer provided such incapacity shall not have arisen from injury or accident received in the service of the Company. If the said Officer shall at any time wilfully neglect or refuse to perform any of the duties undertaken by or devolving upon him under the terms of this Agreement, it shall be lawful for the Company immediately to terminate the engagement of the said Officer without any previous notice.

9. If the said Officer shall be required by the Directors of the Company to remain out of Great Britain for any lengthened period on the Company's business the said Officer shall be entitled to receive additional remuneration in respect thereof.

10. Any special terms or conditions mentioned in the Schedule hereto or endorsed on this Agreement and signed by the said Officer and by two of the Directors of the Company shall be read and construed as part of this Agreement.

AS WITNESS the hands of two of the Directors of the Company on behalf of the Company and of the said Officer

Witness to the signature of
and
two of the Directors of the Company
Witness to the signature of

THE SCHEDULE ABOVE REFERRED TO.

BRANCH—
APPOINTMENT—
DUTIES GENERALLY—
SALARY—
PERCENTAGE ON DIVIDENDS DECLARED (IF ANY)—
SPECIAL CONDITIONS (IF ANY)—
DATE OF COMMENCEMENT OF APPOINTMENT—
REMARKS—

Some questions may arise as to staff regulations, and it is desirable in fairness to have these settled and applied to all grades alike, with the possible exception of the principal officers.

Attendance should be recorded on arrival in the morning and on leaving at night. It is rather a matter of sentiment as to the use or otherwise of a mechanical time recorder. If any such recorder is used at all, it should be of the signature type and be absolutely fraud-proof. For small staffs under ordinary supervision an

Staff Control. Attendance Book, in which each member of the staff signs, is sufficient. 5·2.

In the matter of overtime, this at least should not be at the expense of punctuality in the morning. As to payment for overtime, theoretically it may be uncalled for if the staff are paid for holidays and absence through sickness, but in practice some recognition strengthens the hand of the Head of a Department to meet emergencies, and be always up to date with the work. A monthly award will sometimes meet the case, having due regard to punctuality and attendance. The basis of award should not be per hour, but rather at so much per night up to a certain time. Tea may reasonably be provided by the Company whether any overtime bonus is paid or not.

Overtime in the Drawing Office is sometimes paid strictly at the average hourly rate, but otherwise it may be taken that an overtime bonus for the staff need not work out as much as the ordinary hourly earning in view of the staff privileges. Smoking during overtime is usually allowed, though cigarettes may be barred.

No overtime bonus should be considered for the head of a department, as he should discourage overtime.

The provision of tea in a common room for departmental heads is likely to serve a useful purpose in bringing them together at least once a day, a point of more importance in large works.

5·3. Apart from a record of attendance it is desirable, under most conditions, though not usually done, to have each Departmental Head furnish a Weekly Staff Report showing the allocation of the time of the staff. This has a useful disciplinary effect all round and allows of more careful dissection of expenses. In the case of the Drawing Office, particularly, it is essential for correctly charging to production orders.

Staff Committees. A most valuable development of modern administrative methods is the institution of staff committees.

It is necessary to have a strong chairman of each committee and a capable secretary to serve on all committees, so that the General Manager may derive the maximum assistance from these committees by instructing the committee secretary. This may be better than attending himself, lest freedom of speech be checked.

The following are instances of committees :

Sales Committee—under Sales Manager.

Chief Designer, Estimator and Salesmen attend. The latter make points against the firm's product that they have to deal with when out selling.

Selling-programme adapted to works production programme and schedules of future deliveries drawn up and adopted.

Purchases Committee—under Works Manager.

Estimator and Buyer attend.

Interim orders confirmed and more important buying settled. Contracts for supplies prepared.

Staff Committees.

Progress Committee—under Works Manager.

Chief Designer, Head of Production Office, Estimator and Principal Foreman attend. Position of orders gone into. Overtime requirements settled. Production programme agreed.

Tool Committee—under Works Manager.

Chief Designer, Tool Designer, Estimator and Inspector attend. (Foreman Tool Maker and Foreman Patternmaker attend when requested.)

Provision of patterns, jigs and tools discussed. Drawings of jigs and special tools approved.

Routine Organisation.

Section II b

General Considerations.

By routine is here meant those duties of a regular nature that are requisite for administrative and commercial purposes. The term commercial organisation has advisedly not been used as not sufficiently comprehensive.

In organising every-day duties, the main essentials to be considered are co-ordination and economy. To an extent economy results from co-ordination, but there are many economies possible in routine matters that have little bearing on the larger questions of efficient interrelation of routine duties.

On the other hand, proper co-ordination may mean an increase of paper work, which can be so easily seen, and still more easily condemned, as extravagance or red tape; but the test of economy lies further along the line, in increased administrative control, which should find expression in increased efficiency either in point of quantity, quality or cost of output, or maybe in all.

It is quite possible for the Management to collect more information than it can use to advantage, or which is more costly, or hinders production more, than the information is worth. This is a real danger that has to be guarded against continuously, for routine that serves a valuable purpose when initiated, may cease to be useful by some later change in conditions. Sometimes routines, if the word may be so used to express specific schemes of duties, are established to correct some abuse, or to meet inexperience, and with the education of the parties concerned, the value of the routine becomes too little to be worth while maintaining.

Emphasis might be laid on the necessity, in considering the routine suggestions in this book, to bear in mind that they cannot all be worth while adopting for any one set of conditions; but all the suggestions have been found most necessary and valuable under some one or other ordinary condition.

The recognition of the latent danger of duplication or overlapping, and for that matter to guard also against having links missing in the administrative chain, has brought into use diagrams showing the relation of the various routine steps, as represented by books

General Considerations.

and forms. It will be convenient to call such diagrams Routine Diagrams, and an illustration is given in Section III e, Production Efficiency.

If every routine step is crystallised, as it were, into a definite book or form, it will be quite easy to arrive at a multiplicity of forms that may prove staggering to some managers. These same astonished managers would often be well advised to investigate how many forms and books (plain and printed) are in use in their own works already. Criticism should start from the point of view as to whether the routine step or stage that a form embodies is necessary or not. If the routine step is necessary, then is the use of a particular form necessary? Is any writing saved? Is there any advantage in having all the requisite information in just the same style every time and nothing omitted?

After that comes the question of cost of printing, and because that is prohibitive when only small quantities of a given form are used, recommendation is made of the use of copying processes whereby small quantities can be taken off a gelatine or other process slabs, of which there are kinds that are not messy and can be washed after use. With a copying process and a supply of suitable paper, not too absorbent and cut to standard sizes, a manager need not hesitate to embody all the routine steps in specific forms. These home-made forms will gain in appearance if the copy is set out with the aid of drawing-board and tee-square, and an upright engrossing style of printing adopted.

Forms of simple character should be duplicated by means of the typewriter.

Re-organisation Procedure.

In setting out to reorganise any routine, a good deal of preparation is necessary, if the changes are to take effect smoothly.

Regard must be paid not only to the actual routine changes, or changes of routine methods involved, but to the changing of personal habits and to the influence of personal prejudice.

Once new methods have become accepted as desirable, it is difficult to be patient with those whose prejudice is longer lived. It may be better policy to circumvent this prejudice than to attempt to bear it down by the exercise of authority.

If the reorganisation is in good hands preparatory moves will be made to make ready the course, and this preparation is just as important, even when the prejudice to be overcome is negligible.

Anyone who has had much experience in reorganisation will realise the necessity of keeping an open mind as to the best moves to make and the best order in which to make them. Many circumstances may arise to suggest a modification of original plans, and if

Re-organisation Procedure.

some desired result can be achieved without disturbing some habits, then this should be done. In any case full notes should be set down of existing methods for future reference, before altering anything.

New directions and new meaning can be oftentimes given to established methods by seemingly trifling adjustment.

It is quite an important point to consult those who have to carry out the routine work, as to the actual conditions of the work. Even if the organiser feels that they cannot be expected to understand the principles of the new lines on which he is working, still he will be the stronger for demonstrating to an interested party—it may be an opposing party—the merits of his proposals. If the organiser can convince the routine worker that a modification of routine is desirable, the results of reorganisation are likely to be the greater ; and on purely selfish grounds the organiser should aim to have the staff with him. To take the staff with him means, or may seem to mean, painfully slow progress, but once this inertia has been overcome, progress will be both rapid and irresistible. Above all, perhaps, the loyalty of the staff will have been stimulated and quite possibly much latent merit in the staff have been discovered. Particularly should the staff realise that it is at this stage that their duty is to raise points not seemingly provided for by the organiser.

Reorganisation that touches the habits of men should hasten slowly. The taking on of new habits and the shedding of old habits should be made natural by stimulating the interest of those concerned, in the new methods.

Platitudes of this sort are easily expressed and as easily ignored as being a counsel of perfection. Anyone attempting to reorganise must adopt his own methods largely, if he is to express himself adequately in his work, but emphasis may reasonably be laid on the educational character of the work. Patience and care in this direction is quite as important to the ultimate result as executive authority to enforce the new ideas.

Managers should guard against the passing of panic legislation. Something goes wrong, and there is a great hubbub. The Manager feels called upon to make some alteration of method to prevent a repetition of the trouble. He therefore lays down certain rules which quite likely will stop further trouble of that particular variety. Frequently he would be better advised to analyse the conditions that allow this trouble to arise in any acute form.

Not uncommonly systems, or what pass as systems, are built up in this piecemeal and impetuous way.

Swift decisions may seem the only proper expression of strong management, but they can easily be wrong in regard to organisation, and should be avoided on principle. On the other hand, vacillation

Re-organisation Procedure.

is fatal to efficiency, and it is even better to stick to a wrong decision than to go back on earlier instructions without very good cause.

No organisation is established until each routine duty is a habit, and this consideration must stay the hand of a manager in making alterations in routine.

In re-organising on modern lines, which means using modern methods, it is an important preliminary to arrange for stationery to be looked after properly. The adoption of form cards and sheets and the like, calls for more than usual attention in keeping the stock of stationery.

Having formulated the main lines on which to work, the running out of stock of old stationery will afford the best opportunity of introducing new forms. Controlling the stationery stock means early knowledge of these opportunities.

Colour schemes may be made a valuable factor in facilitating the smooth running of the various routines. Some care is necessary in adopting colours. It may be necessary sometimes to adopt different coloured inks where different coloured papers or cards might be confusing. Where carbon duplicates are made, the carbon copies should be distinguished from each other and the original, or top copy, by distinctive colours of papers or inks. Colour schemes may obviate having a different printing on each of the several copies, and this will be an economy. The difficulties of a colour scheme are somewhat reduced and ready distinction made between executive and memorandum copies if the executive (preferably the top) copy is always on white paper. By executive copy is meant the copy that is the actual order or request to some department to do certain things. The carbon copies are of a memorandum character.

Standardisation of form sizes is very important particularly for the ultimate filing of the cards or sheets. This standardisation of sizes is one of those preliminary steps referred to above, that will help clear the way for developments.

Provision for filing of papers is another preparatory step.

It is desirable to have the designing of all routine forms pass through one channel. This will facilitate standardisation and give a certain regularity to the forms. Uniformity of style and size tends to confusion between one form and another, but this objection is overcome by giving a plain reference No. and title to each form in the top left-hand corner, in addition to the distinctions possible with colours.

By using reference numbers the clearness of routine instructions is greatly helped, and by affixing letters after the number to represent successive editions (if amended) of any form, both instructions as to their use and stock-keeping is facilitated.

Re-organisation Procedure.

There is no doubt of the necessity for registering the routine pertaining to each form, and these instructions should be issued to all concerned for insertion in a suitable guard book. The guard book should be handed in on resignation or change of duties.

Whenever possible, the routine instructions should be supplemented by a routine diagram, showing the path of the different forms as to the executive copy and the memorandum copies.

Emphasis generally should be laid on the importance of each person, handling any form, being responsible for its completeness as it comes to him. A parallel may be found where a workman is responsible for the accuracy of work as he receives it. While in production this check may be insufficient, in routine matters such a check ought to be sufficient.

No system can be efficient that is not kept strictly up to time.

A point that may be made is that newly appointed managers should look very carefully into the system of accounting before disturbing any of the existing conditions in offices or works.

It will generally be desirable to reform the system of accounting, if reform be needed, before reforming the administration, so as to get the accounts in their new form to reflect the old conditions. If this is done, a fair comparison may be made with new conditions when these have been established, but otherwise the new manager may find himself unable to demonstrate economies from the very fact that methods of allocation and treatment of expenditure have been simultaneously altered.

Correspondence.

Section II c

General Responsibility.

THE proper routine for correspondence hinges on the apportionment of responsibility.

If there is a fully constituted Correspondence Office, then the clerk in charge may take a large measure of responsibility as to the handling of correspondence, but his particular function must always be the filing and mailing of correspondence.

Whether a Correspondence Office exists or not, the essential responsibility for the subject matter of the replies must rest on the Departmental Heads concerned, and for this reason each Head may possibly sign all the letters he is responsible for.

On the other hand, there is a good deal to be said for the General Manager actually signing all letters, if he is to exercise an adequate control of the departmental dealings with the outside world.

It is not possible to say how this matter should be dealt with in

General Responsibility.

a given case, without very careful consideration of all the conditions. The calibre of the Department Heads and the engagements of the General Manager are all important factors together, of course, with the nature of the business.

It may be taken as sound practice to restrict the signing of letters to as few officers as possible, and to have a strict ruling on this matter. The advisability of this course is obvious, as letters are frequently of considerable importance as to wording, both legally and as a matter of diplomacy. Another point may be made in passing as to never allowing a letter to be sent out that is not strictly courteous, however firmly worded. The temptation to write stinging replies should be resisted, as not likely to serve the best interests of the firm.

The art of writing concise, lucid letters requires cultivating, and the influence of the General Manager in that direction by seeing all letters, as to the impression they will give to the recipients, is likely to be much more reliable than that of the party who has dictated the letter.

The responsibility for the safe disposal of remittances received by post is best met by the use of a Cash Inwards Book, in which entries are made during the process of dealing with the mail and before the letters are issued from the Board Room, or wherever the morning's mail is dealt with. The entries will require to be checked at the time, and this will be arranged between the officials who deal with the letters in the first instance, probably the Secretary and Correspondence Clerk.

Another point deserving mention is the responsibility for despatching correspondence. Where there is a Correspondence Office the duty clearly lies with that department, but failing such a department, the matter requires looking after by an adult member of the commercial staff assisted by the usual juniors. If need be, the duty may be taken in turn round the office, as a certain delay in getting away at night is likely to be entailed. The question of enclosures is quite an important feature of mailing that requires watching, and senior help is advisable in connection with checking enclosures, stamping and the catching of mails. The mailing in one envelope of all communications to any one firm requires some little organisation, and may not always show enough economy to be worth while. Window envelopes greatly facilitate mailing.

General Routine.

Strictly speaking, every letter received ought to be replied to the same day as received, or, failing a reply, a formal acknowledgment should be sent intimating that the letter is having attention.

The Correspondence Clerk can with advantage watch that replies are not held up, though a good deal of routine work is involved if this is to be done, as compared with just issuing the letters as received to the Departmental Heads concerned, and leaving them to deal with the replies. **General Routine.**

It is always important to endorse the date received on every inwards letter or other document. A numbering stamp can be incorporated with the dating stamp, so that no extra operation is necessarily required if letters are numbered. Numbering is an essential preliminary to registering. 5·4.

The necessity for registering inwards correspondence and marking off the replies depends on local circumstances. If these arrangements are entirely favourable, the risk may perhaps be taken of letters not getting attention for want of a register. Generally speaking some sort of register is necessary, if only of a very simple character. 5·5.

Where there is a Correspondence Office for the filing of all correspondence and for writing letters to Departmental dictation, it may prove a serviceable compromise if the Correspondence Register is only entered up as regards the name of the sender, the numbers being already printed in. Such original letters as, however, are passed out of the hands of the Correspondence Office, should first have their contents briefly entered in the Register, and the disposal of the letter indicated. An alternative method, and one rather to be preferred, is to retain the original letter in the Correspondence Office and type a copy for issue to a Department. This practice allows for extra carbon copies to be sent to other interested parties for the one typing.

Under the latter arrangements the Correspondence Clerk can hold the originals in a sorting device, under departmental names, pending the receipt of the reply, and can readily watch that replies are not unduly delayed.

If the departments are furnished with copies of inward letters instead of originals they can retain these copies, and to same can be attached an extra carbon copy of the replies—the official copy of each reply being filed in the Correspondence Office with the original letter. This gives each Departmental Head a file of his own correspondence without reference to the Correspondence Office. The official copy should be on distinctive colour paper from that of the departmental copy.

Press copies of outward letters showing the signatures must, of course, be taken, and the modern copying machines allow for loose sheet copies to be made very rapidly, it might be said automatically. Comparison with the old method of using copying presses and bound letter books is entirely in favour of the modern methods, so long

General Routine.

as there is the proper organisation for controlling the filing of correspondence. The institution of adequate control of filing must precede the adoption of loose sheet methods.

Not infrequently the letter book system is retained in conjunction with the filing of carbon copies of the replies with the original letters. This allows for the adoption of a modern system of filing. The objection to retaining the letter book is the serious delay in getting out any volume of correspondence, and sometimes the uncertainty of obtaining serviceable press copies.

The use of dictating machines enlarges the function of a Correspondence Office by obviating the necessity for departmental stenographers, or for attendance of stenographers from the Correspondence Office.

Dealing with callers and telephone messages may advantageously and does, naturally, come within the scope of the Correspondence Office, and the control of the Door Attendant may also be given over to the Correspondence Clerk. The use of callers slips is not usually any improvement on requiring their cards, and does not particularly help matters.

If the Door Attendant refers to the Correspondence Clerk for instruction as to every caller, it becomes easy to insure appropriate treatment and avoidance of delay, it being understood that the Correspondence Clerk is fully posted as to callers expected by any department.

When there is a private telephone exchange this has frequently to be looked after by the Door Attendant. If, however, the telephone exchange cannot be looked after by the Door Attendant, an arrangement having some good points is to provide a telephone in the waiting room, so that callers may ring up the departmental heads they are interested to see. This plan will save much time all round.

Filing Routine.

The advantages of the various systems of filing now available are sufficiently advertised by the makers of the various appliances and accessories as to need no mention here.

The essential principle of any satisfactory system is that each letter and its reply should be filed together, and that all correspondence with any one correspondent or on any one subject should also be filed together and, preferably, be contained in a folder independently of other correspondence.

The question of filing under subject references is fraught with difficulties, except it be carried out on broad lines that are the natural outcome of the particular business under consideration.

Correspondence with agents, for instance, will be likely to necessitate sub-classification under subjects of which the following are typical: Appointment as agent, Financial, Miscellaneous, Quotations. Quotations may again have to be subdivided under the headings of different lines of products. **Filing Routine**

The adoption of number symbols in lieu of alphabetical sequence of names undoubtedly facilitates filing when the number is known and tends to ensure that old records, which have been transferred from the current filing cabinets, should be found as quickly as current records.

An alphabetical card index will be necessary to give the requisite cross reference to the number symbols. On this same index card can be recorded, if thought necessary, a summary in brief of correspondence with each correspondent. This will facilitate reference to particular subjects and its adoption must depend on the frequency of each class of reference. Current reference will hardly require the aid of a written index, except, maybe, in the special cases of agents and other instances of voluminous correspondence from any one party. The same alphabetical card index will furnish a record of addresses. 5-6.

In the matter of correspondence *re* purchases, the classifications under subject matter is likely to be more permanently useful than the name of the firms, and the general classification suggested, in connection with stock accounts, will be found helpful in formulating a scheme of subject number symbols. There may be under each heading, subdivisions dealing with, say, enquiries and quotations, deliveries, and accounting matters.

In certain directions, such as the collection of accounts and following up enquiries, the filing of the correspondence is really only subsidiary to the record in the card index. Separate card indexes are essential in such cases, and will be kept up in the Financial and Sales Departments respectively.

In adopting any method of indexing, whether numerical or alphabetical, or a combination of both, regard must be paid in the first instance to the conveniences of locating correspondence that has been transferred from the current files.

A numerical system is apt to be rather cumbersome for occasional correspondents, and yet the correspondence in individual cases may easily rise beyond the point of convenient finding under alphabetical references, unless the subdivision under each alphabet letter is carried to a fine point. If a finely subdivided alphabetical scheme is necessary or simpler for the rarer correspondents, it becomes a question if that scheme should not cover the more frequent correspondents as well. One notable system of this class is developed to the extent of there being 240 subdivisions of the alphabet.

Filing Routine.

Investigations by the same people show that the proportions of English names under the respective initial letters of the alphabet average out as follows per 1000 names :

A	B	C	D	E	F	G	H	I	J	K	L	M
34	105	82	44	24	36	50	83	7	25	21	50	74
N	O	P	Q	R	S	T	U	V	W	X	Y	Z
21	10	55	1	48	96	40	3	8	78	—	4	1

It will be obvious that subdivision under the different letters will, in turn, require to be averaged out if each subdivision is to have anything like an equal amount of correspondence to hold. The best of schemes will be upset if special files are not set aside for voluminous correspondents, and a numerical scheme for such should prove entirely advantageous.

Internal Correspondence.

Correspondence within the Works should be for the most part carried out by specified forms appropriate to each routine. A certain amount of memorandum work will arise, and a suitably
5-106. printed form regularises it without entailing appreciable expense.

Under some conditions it may be necessary for the recipient of a memorandum to initial for it on the fast copy in the memorandum book, brought by the messenger.

The transit of routine forms and memorandums between departments, whether shop or office department, should be dealt with by a works post operating from a suitable centre. This centre would naturally be the Correspondence Office as to office departments, with a separate service for the shops run from another centre, such as the Works Office.

The manner of the service will be to have messenger boys make regular journeys round the departments leaving one post envelope and collecting the waiting one. The sorting of the papers thus collected will require close knowledge of the works and office routine. The institution of a works postal service should precede any development of modern routine systems involving the continuous transit of forms between departments. Under proper control this service will obviate papers going astray, it will give a prompter service all round than special messengers and be cheaper.

Section II d

Publicity and Sales Promotion.

Publicity.

THERE is nothing new in the present-day need for publicity, but there is a change, as compared with preceding years, in the necessity of reaching a wider public than used to be attempted, and beyond that there is something new in the skill and expenditure requisite to achieving that end satisfactorily.

Publicity.

Advertising, as perhaps more ordinarily understood, is associated with advertisements in periodicals, and it is convenient to adopt the wider term of publicity so as to cover every possible means of reaching the public. By public here is meant, of course, that portion who may be considered as prospective customers or able to influence custom, as in the case of employees.

No attempt will be made here to discourse at length on the art of advertising. Sufficient to say that there is both an art and a science in the matter, and the psychological element is very real, whether it be considered a question of becoming known to the public or convincing the public as to desirability of purchasing the goods offered.

The channels, or media, through which publicity may be effected are numerous, and a few may be indicated :

Advertisement Literature (Catalogues, Occasional and Monthly Circulars, House Journals, Photographs, Calendars and the like).
Exhibitions.
Cinematograph Displays.
Public Trials and Tests.
Calls by Commercial Travellers (or Agents).
Advertisements in Periodicals and other Publications.
Insertions in Directories and Buyers' Lists.
Advertisements in Public Places.
Loans of Models to Public Institutions and Schools.
Reference in the Press. Description of works consequent on visits by public associations.
Personal prominence, in technical or commercial matters, of the principals of the Company. Lectures and contributions to the press by members of the staff.

The control of publicity expenditure requires the exercise of perhaps more discretion than any other class of expenditure.

The difficulty lies in knowing the real value of each medium used. No expenditure on publicity is perhaps wasted altogether, but there may be a world of difference in the benefits derived from different media.

If the medium used does not reach the right public, no brilliance, in regard to the form of literature or advertisement, can remedy matters. Sometimes the medium used may be right, but the appeal does not reach the public for want of forcefulness.

The public must learn to mentally associate the name of the firm with the goods advertised, and conversely the ideal position is that any mention of such goods shall suggest the name of the firm —not that that sums up the whole art, because advertising has to stimulate the public to the point of buying the goods offered.

There is usually a reluctance to send enquiries to unfamiliar firms, and correspondence in these days is so heavy that a limit is apt to be set in the number of enquiries that can be sent out; and this limit may be reached with the few firms best known to the buyer.

Publicity. This matter of familiarity enters into the consideration accorded to a firm's catalogue, not perhaps as to its safe custody but as to the extent it is used.

A thoroughly well prepared catalogue designed to help the purchaser to decide his requirements, and make his selection, is likely to win its position as a book of reference. It must always be borne in mind that a meritorious catalogue may not be at hand at the right moment to influence business, and the essential position to be in is to so advertise that the buyer can hardly help remember your name when he is interested in your class of goods. Your catalogue will then be referred to.

Touching, again, on the matter of controlling publicity expenditure, it is perhaps the best plan for the Directors to annually sanction a total prospective expenditure based on a proper report from the Sales Manager. This total may advantageously include every kind of charge that is included in the accounts under the heading of publicity.

The rate at which this appropriation is taken up and the directions in which it is applied must be left largely, perhaps wholly, to the Sales Manager.

It may be remarked here that an important value of all advertisements is in the right it gives to press notices in the body of the paper. There are trade papers of sorts who offer " puffs " conditional on the purchase of a certain number of copies of the particular issue, but the value of notices in such periodicals is hardly likely to be worth much. The more reputable trade papers do not insert " puffs " of flagrant character, but none the less welcome well written and illustrated articles describing the latest models and improvements, if legitimately described. Trained journalists are sometimes employed for this work, just as trained advertising specialists are employed for preparing advertisements.

The keying of advertisements, such as asking the public to address Dept. M., etc., is generally admitted to be of little use. If a particular line of product is advertised exclusively in one journal for a definite period, some results can be traced, but this may be at the cost of neglecting more profitable media meantime.

The advertisements proofs require to be properly classified, mounting each one on standard sheets adapted for filing in book form similarly with every kind of press cutting.

5·7. An accurate register of blocks is very necessary. The register may be in card or loose leaf form—a pull or impression being the essential record in each case. Each block should be numbered and recorded in a book register under catalogue or class—the block number and firm's name being stamped on the side of the block and electros.

The records may include specimens of illustrations from the Company's electros in traders' catalogues. **Publicity.**

Every detail of publicity work must be carefully organised so that the Sales Department shall be able to disseminate improved and new copy with precision and without overlapping.

The alertness of this department may be stimulated by the offer of prizes for publicity suggestions from any member of the staff of any department.

A point may be made as to the good use that may be made of photographs, particularly if sent out mounted.

Sales Promotion.

Sales promotion is a matter upon which much has been written, and the virtues of follow-up systems are kept in evidence by the card index dealers.

When a man is interested enough to make a first enquiry, there is undoubtedly good business in following the matter up.

Preferably a traveller should call if only to report to headquarters the apparent status of the firm, although for information of that character an enquiry through one of the mercantile offices may be sometimes the cheaper way, and the information may be useful later in regard to giving credit should an order result.

Every legitimate excuse for calling on a firm should be, if possible, taken advantage of as leading to friendly relations, but too great persistence obviously annoys and defeats its own ends.

Follow up work should be done in addition to calling, but not to excess.

If a firm has shown their interest enough to make an enquiry or write for a list, they should be included ever after in any sales promotion campaign as more likely to become customers than those who have never enquired.

The issue of special bulletins, as they are called in the United States, at stated periods tends to stimulate interest that undated circular matter does not. The bulletins should, if possible, be personally addressed to a responsible officer of the firm. Some firms send out monthly lists showing the deliveries that can be offered of their various lines.

If business is to eventuate with a firm, who have made a first enquiry, steps require to be taken to ensure getting successive enquiries and the expense and trouble of follow-up work is likely to be fully justified ultimately in the majority of cases.

In regard to literature, its quality in every sense should be such as to suggest on examination a high quality in the goods offered.

Local conditions must regulate entirely the extent to which the 5-8
efficiency of various follow-up moves shall be analysed and results

Sales Promotion.

summarised. Sufficient recording ought to be done to provide the Sales Manager with some data on which to justify the expense entailed. A general increase in sales may be due to other causes than sales promotion efforts, just as a general decrease may not always be fairly laid to the charge of inefficient sales promotion.

It is a very unsafe line of reasoning to assume that a successful year or years of trading confirms the efficiency of all the steps taken in good intention towards that end.

Unceasing critical analysis is the spirit of Scientific Management, as applied to the workshop, of which so much has been written and for which so much has been claimed. There is no restriction to the application of these principles, although the study of workshop operations is more amenable to scientific treatment than publicity and sales promotion efforts.

The education of the firm's travellers so that they shall most effectually promote sales, and work in close co-operation with headquarters, is a matter that each Sales Manager needs to arrange for. This aspect has been touched on in connection with the discussion on staff committees, where reference is made to a Sales Committee of which the travellers or salesmen are members, and meet the firm's Chief Designer to thrash out the arguments for and against the Company's products.

The cinematograph is being used to educate travellers in their work.

Travellers' reports should be sent in daily for every call made. If a separate sheet or card is used for each firm, these can be filed and utilised for sales promotion work more readily.

Each traveller's programme should be known in advance at the Head Office, and to a very large extent, perhaps wholly, regulated from there. Advance knowledge is necessary, if proper attention is to be given to enquiries without dislocating the traveller's work.

The traveller should report each night his return address for the next day, and the day following. The report form should indicate this necessity.

Section II e

Estimates.

General Considerations.

Estimating is very differently handled in different concerns. The nature of some businesses enforces the maintenance of a fully constituted Estimating Department, while in others estimates are made up in a less regular way. Sometimes the Works Managers will " size up " a job and give an approximate figure, which may be something better than guessing, but will be something worse than knowing. **General Considerations.**

The more ordinary alternative is for a draughtsman to get out the quantities and then to collect opinions, frequently at short notice, from the various foremen likely to be affected. The buyer will usually have to obtain the required quotations for special materials. There is no absolute reason why a foreman should not be able to estimate as closely as anyone else, but he obviously has relatively little opportunity for collecting cost data, and has less time, so that it is not altogether fair to look to him for more than rough estimates.

Where a proper Ratefixing Department exists, the detail labour estimating may be carried through there, but the best arrangement must always be a self-contained Estimating Department.

In considering staff organisation in Section IIa, the suggestion was made that the Works Accountant would frequently be able to act as Estimator with advantage. It may be taken as probable that he would obtain much of his information from the Drawing Office and the Ratefixing Department.

In considering the possibilities of estimating, due regard must be paid to the trade conditions regulating the fixing of selling prices. If selling prices are arbitrary, a rough estimate of material and wages costs may serve, but it is dangerous practice to follow a trade lead blindly, because the apparent margin indicated by a rough estimate may prove to be quite illusory.

An estimate ought to be so made up that the materials and wages 5·9. elements shall be computed very closely together with an appropriate allocation of works expenses, called for convenience shop charges, and based on the labour involved. After this there must be an adequate contingency allowance to meet the cost of errors and defects (during the course of production), overtime, and, in certain cases, inspection possibilities and guarantee liabilities.

Guarantee conditions necessarily vary, but a typical undertaking may be cited :

GUARANTEE.

All Blank Products are accepted by the Purchaser subject only to the following express warranty, which excludes all warranties, conditions, and liabilities whatsoever which might exist but for this provision :

In the event of any defect being disclosed in any part of a Blank Product (except specialities of other firms, for which we shall not be responsible) we undertake, on return of the defective part to our Works, carriage paid, within twelve calendar months after the delivery of the product, to examine it, and should any fault be found, on such examination by us, to be due to defective material or workmanship we will repair the defective part or supply a new one in place thereof, free of charge.

Besides the contingency allowance, consideration must be given to the cost of drawings, patterns, jigs and special tools and a suitable provision made in the price of each item of product, so as to recover these costs in due time.

General Considerations.

In the treatment of works accounts in Section IV., recommendation is made as to identifying all costs of drawings, patterns, jigs and special tools, with the order on which first incurred. This course does not imply that the selling price of the first order should cover the whole of these costs, in all cases, or, in a strictly manufacturing business, in any.

In the matter of shop charges, the issues involved are discussed at some length in Section IVf. It is very necessary that the Estimator shall appreciate the true incidence of shop charges, and shall prepare his estimates in such detail that the correct shop charges may be applied.

It is recommended that shop charges be applied on the basis of time worked rather than of wages paid, and for estimating purposes substantially the same result may be obtained by expressing the shop charge per hour in terms of a percentage on the average wages per hour.

Very frequently, perhaps more frequently than not, the application of shop charges is carried out in a very arbitrary fashion. A flat percentage is, under such conditions, usually applied to the total wages, no discrimination even being made between machine and hand wages. Sometimes a percentage is added to the estimated material, and so far as this is a contingency allowance the practice is well founded, but as an allocation of works expenses, pertaining to materials, such a percentage is quite arbitrary, when applied indiscriminately. In the case of heavy bulky product some recognition of handling expenses may be desirable.

The use of arbitrary percentages on either wages or materials, or both, in the building up of a selling price may, however, be almost necessary by reason of established trade practice. Trade practice in no sense gives the hall-mark to any system, but it would be poor policy to ignore a method that may give some indication of the prices that have to be competed with.

It may, in some trades, be found a desirable practice, from the point of view of fixing selling prices, to prepare the estimate totals on the lines of arbitrary percentages for shop charges, commercial expenses and profit, as well as on the same lines as the actual cost accounts are prepared. These alternative methods will involve very little extra trouble, as the detail necessary for following a proper costing system will more than provide all that is necessary for applying arbitrary percentages.

With regard to contingency allowances, the allocation of commercial expenses, net profit, and possibly even as regards an allowance for drawings, patterns, jigs and special tools, the use of arbitrary percentages is about the only practicable method.

General Considerations.

So far as commercial expenses are concerned, these are best provided for by applying a gross profit percentage covering these expenses and the net profit. Commercial expenses are to be understood as including all expenses not directly pertaining to the works. All other costs should be included in the estimated works cost, even where, as in regard to the contingency allowance, there is no exact parallel in the works accounts, and where, as in the case of drawings, patterns, jigs and special tools, the estimate may only provide for a portion of the actual costs.

A point may be made as to how the gross profit percentage should be applied. If applied on the inclusive works cost the basis will be more consistent, but it is more usual to consider the percentage in relation to the selling price or turnover. As an example, it may be remarked that if the selling price is reached by adding say 50 per cent. to the works cost, this would mean a gross profit percentage of only 33⅓ per cent. on the turnover.

Construction of Estimates.

It is recommended that the cost data which is so important for proper estimating, shall be ordinarily kept under the following heads for each order :

Drawings, Patterns, Jigs and Special Tools.
Net Production Costs.
Errors and Defects.
Final Inspection, Packing and Despatch.

Under Net Production Costs there should appear, as regards wages, separate totals for Direct Machine, Direct Hand, Secondary Wages and Overtime Charges. The secondary labour is the labour employed on an order but not directly on the work, thus assisting and viewing might be dealt with in this way, equally with attending on customer's inspector and carrying out customer's tests.

As to overtime charges, these are only the extra allowance that is paid to workmen when working beyond the normal day. Thus an hour and quarter's wage may be paid for an hour's work, and it is this extra quarter of an hour that is in question as an overtime charge. Questions might arise of other overtime charges, such as power, incidental to a particular order.

So far as estimating is concerned, only the direct machine and direct hand labour can be detailed out. Secondary labour must be allowed for by a percentage addition to the direct wages. Overtime allowances will be allowed for by means of the contingency allowance, applied as an arbitrary percentage.

Turning to materials, as ordinarily understood, it is advocated that the works accounting system shall discriminate firstly as between materials proper and disbursements.

Disbursements may advisedly comprise staff charges (as, for

Construction of Estimates.

example, Drawing Office time) and despatch charges (freight, insurance, etc.). The wages and expenses of men working away can conveniently be dealt with as disbursements, and so avoid confusion with works wages. This separation also ensures discrimination in the application of shop charges.

As regards materials proper, this may advantageously be dealt with under four main headings :

Special Purchases. Process Products. General Stock. Component Stock.

The headings are almost self-explanatory, but are necessarily dealt with at some length in connection with works accounts.

The term " Process Product " is not a usual one, and is arbitrary enough to require explanation. A process product is considered in this book to be the product of a departmental process, of such a nature that it is convenient to treat such product as the " material " of a further stage. The most typical cases are the products of the Foundry and Smithy, viz. castings, forgings and stampings. Galvanising and plating are other instances of processes requiring a similar accounting treatment, though not otherwise on all fours with foundry and smithy processes.

It is recommended that the heading of " Process Products " should include purchases of the prescribed character as well as works products. This consistency will add to the value of cost data for reference purposes, and possibly influence the make up of the contingency allowance included in the estimate.

It is a matter of importance that process products shall be priced out accurately, and this can hardly be achieved by taking the average cost per unit of weight for the whole of the products of a given period, although such a practice is quite common.

In most brass foundries, the nature of the work makes it difficult to get individual costs, and average rates per pound are almost unavoidable. By grading the average rates up and down, to suit intricate castings and simple castings respectively, a very close approximation to the individual costs may be reached.

With iron castings, forgings and stampings individual costs as to the principal operations can be obtained, and on this basis individual rates per hundredweight can be calculated. A number of points are involved, and these are discussed further in Section IV g.

For estimating purposes typical rates, appropriate to the class of work under consideration, can be obtained from the cost records and applied on the basis of the estimated weights of the respective castings and forgings.

5·9. In the building up of an estimate, there is no appreciable trouble involved in dissecting the material under the headings previously mentioned, and considerable help is afforded in the comparison, later, of the estimated cost and actual cost.

Construction of Estimates. 5-10.

No definition seems necessary of special purchases, as these will be understood to refer to purchases of material not ordinarily kept in stock.

A representative list of typical items of general stock is given in Section IV d.

It is suggested in the same section that component stock should comprise standard fittings. The important point in regard to component stock is that the value used for estimating purposes includes material, wages and shop charges. Differentiation is desirable for fixing contingency allowances.

Returning to the matter of wages or labour costs, there is a great deal to be said for working out the detail of the estimated labour in terms of hours under a suitable range of headings, such as turning, milling, fitting, etc., and then applying to the total hours under each heading an average wage rate and an average shop charge rate.

The advantage of this method lies in furnishing a most valuable guide to the probabilities of delivery, having regard to the shop capacities of the respective kinds.

The difficulties of applying this method will lie in the tendency of estimators to estimate the wages as a lump sum for all processes on each component. To dissect the labour under the main processes, whether in terms of time or money, must take a great deal longer, in comparsion with the lump sum method; but, on the other hand, the result will certainly be more accurate and more useful.

Where the estimate has reference to a line of standard product that will be manufactured in quantities, extra work in preparing the estimate will be well repaid. It is a very proper thing for the General Manager not to permit any standard product to be manufactured until an estimate prepared on these fuller lines has been made up and submitted to him.

Where the Estimator cannot go the length of dissecting the wages costs under specific classes of labour, he should at least separate machine labour from hand labour.

Estimator's Functions.

In the discussion on staff organisation, it has been suggested that the Works Accountant may act as Estimator. To simplify the present discussion, the Works Accountant's possible dual rôle is ignored. This possibility will rarely exist if instead of a Works Accountant of adequate practical training, there is only the more usual Chief Cost Clerk.

Estimator's Functions.

The Estimator might reasonably direct the dissection to be carried out in the cost accounts, and his functions should cover the comparison of actual costs with estimated costs. 5-10. He should investigate all important differences before submitting the figures to the General Manager.

A yet further development lies in the direction of preparing a schedule of output of which more will be said later.

Yet another direction, in which the Estimator* may fill a valuable rôle, is that of adjudicator on the cost of all errors and defects developed during manufacture. He may advantageously prepare periodical reports, say fortnightly, to show the amount of defective work for which each department has been responsible, including in this the Drawing Office, Buying Department, and any office department concerned. These reports have been found to exercise a most salutary influence all round in keeping down this waste of money. The arrangement is also sound in providing a total figure of these costs, without sacrificing the advantage of including the costs under the respective production orders in the cost accounts proper.

The Estimator, as previously pointed out, should be in a position to discuss with the General Manager as to the class of work to be sought after and the lines of product to be offered for sale.

He will know that to ensure sales the product must be made right, the price must be right, and the delivery must be right. Conversely he will know that unsaleable product will result mainly from bad design, bad workmanship, high cost and late delivery.

An aspect of estimating which might perhaps have been mentioned earlier is the attention requisite in considering the specifications and conditions of contracts for which tenders are invited.

The ability of the Estimator to effectively criticise the technical responsibilities attaching to any contract will add greatly to his value.

It has been well stated that the value of a good estimating department is most apparent in the work the firm does *not* get.

A point may be made as to the importance of all cost data for products of similar character being expressed in chart form. The same thing should be done for weights. Intermediate sizes as they arise may then be approximated from the resulting curves with considerable accuracy.

The classification of cost data and estimates must be appropriate to the business of the Company.

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* Under some conditions, the Ratefixer may better perform this function.

Production Efficiency.

Any consideration of output ought to have as its starting point the question of production efficiency.

The conditions most favourable to production efficiency are those of mass production, or the continuous manufacture over lengthy periods of the same line of product.

Sometimes the theory of mass production is adopted without the practice. The motor car industry has furnished numerous examples of this, the frequent—one might say incessant—changes of design nullifying any advantage that should lie in manufacturing in large or relatively large quantities.

Changes of so-called standard design, and consequent dislocation of production, may originate in the Drawing Office, or may be necessitated through the Sales Department accepting orders of special character.

It is rarely possible to lay down any hard and fast rule that the customer shall not be met in any particular. Considerable judgment is required to decide in what respect any latitude may be allowed in meeting a prospective customer's wishes. On this decision must rest a greater part of the manufacturing policy.

Many firms do not pretend to attempt mass production or indeed manufacturing at all. In their case each order is carried out naturally to the customer's specification, and only a very limited efficiency in production can be attained. The efficiency may, however, be entirely satisfactory from a commercial point of view so long as the selling price obtained is appropriate to the conditions.

Despite the acceptance of customers' specifications, there may still be room for standardisation in certain details, so that a higher efficiency in that portion of the production may become possible—more particularly when a firm specialises in a class of product without adhering to a standard type.

The effect of specialisation on administrative methods, especially with regard to controlling output, is very marked.

While from a commercial point of view it may be argued that a wide range of products means a wider market and greater certainty of full employment of the works, due regard ought to be paid to the great difficulty in organising a business of such a character. The alternative to organisation is extra dependence on the personnel of the staff, and the liability to inefficiency and changes in this direction makes it a risky arrangement. The importance of the staff in achieving a successful organisation is not, however, to be under-rated, however well devised the scheme of organisation may be.

Regulation of Output.

The primary difficulty in regulating output is to satisfy the claims of customers for delivery, the sequence of orders received having little relation to the sequence of deliveries insisted on.

The Sales Department frequently feel called upon to make a promise of delivery, when seeking an order, which it may be quite impossible for the Works to keep, without sacrificing attention to earlier orders and possibly not then.

There will be at times strong reasons of policy in giving preferential delivery to some order over the orders already in hand, but the reaction on production efficiency is distinctly unfavourable and for most works managers distinctly discouraging.

Only reasons of high importance can justify radical changes in the production programme. Generally speaking, an order once started in the machine shops, as distinct from obtaining all material in readiness, should be carried through to a finish. The machining stages of an order require more negotiating than any other, owing to the innumerable operations and the necessity for awaiting turns on the various machines.

Usually it is in the machining stages that defects of material and workmanship arise, adding greatly to the risks of this stage not working out in regard to time as planned.

The present purpose is not, however, to consider the regulation of work in progress, but rather to consider in what way output should be regulated as a matter of general administration.

The Works Manager has only a limited production capacity at his command, and this holds good, though to a different degree, after taking full advantage of all the possibilities of increased output that lie, for instance, in the premium system and also of overtime.

Every false start—for interruption of production to meet new requirements has that effect on the work interrupted—every false start is so much irrecoverable loss of the works capacity. The false start lies in the fact that the momentum that had been obtained on the interrupted work is lost and has to be recovered. The cost is not to be summed up merely by the wasted setting of machines, though this sometimes means a good deal, but mainly by the wasted setting of men's minds—managers, foremen and men.

It is suggested that the most satisfactory method of achieving
5·11. an all-round efficient compromise between Sales Department and Works, as to output, is for the Estimator to be responsible for arranging the dates of delivery on every order. As an estimator he cannot very well overlook the limitations of the Works, and yet he is bound to recognise how much depends on delivery in seeking contracts.

Out of his full knowledge of detail and his data of past performances, he can exercise a skilful judgment in the making of promises of delivery, and he can, moreover, regulate the Drawing Office programme. The latter possibility is particularly important when the Drawing Office is not directly under the Works Manager.

Regulation of Output.

It may be necessary in some businesses to have regard to the value of the monthly turnover in arranging delivery dates, so that there shall be an adequate monthly delivery of finished goods which can be invoiced. In all these connections, the question of output under stock manufacturing orders must be kept in mind.

Similarly, too, with experimental work which may absorb the works production capacity to the detriment of promised deliveries. When the Experimental Department, or Model Room, as it is sometimes called, is quite separate from the ordinary manufacturing departments, no consideration of this sort may be involved.

Manufacturing for Stock.

Manufacturing for Stock occurs in most works, and usually where mass production obtains, substantially all the manufacturing will be for stock.

Whether little or much of the production is for stock, it is desirable to establish some system of control by which the stock production is sanctioned.

In the case of mass production, the sanctions will probably emanate from the Board of Directors or Managing Director, and this may be so when stock production comprises only a portion of the whole production. It may be presumed that all stock production, however seemingly trivial, shall be sanctioned at least by the General Manager. 5·57.

The Estimator may have the issuing of Stock Manufacturing Orders under these sanctions, as certainly no sanction ought to be given by the General Manager without a knowledge of the estimated cost.

Stock Manufacturing Orders that are taken out to keep the shops employed through a lull in sales requirements are apt to be treated purely as a " stand-by " job, and unless looked after properly may cost an excessive amount.

The question of providing a proper stock of spare parts touches a good many businesses, and much care is required to provide adequately in this direction without incurring bad stock.

The usual basis for ordering up spare parts is to take the consumption for repair purposes during some preceding period. This is all right for an established product, the design of which has not altered, but there will be frequently a need to make provision of spare parts with very little data to go on, other than experience with some similar product. In the tentative stages—and many

Manufacturing for Stock.

businesses seem never to get past that stage in their stock production—it will be better economy to hold a fairly generous stock of spare parts in the unmachined stage, viz. as castings, forgings, stampings or bar and only to machine to a finish in relatively small quantities.

The potential economy of producing spare parts in large batches is frequently discounted by the difficulty of getting more than a small batch through each operation at any one time.

Another factor entering into the matter of stock production, more particularly of complete assembled product, is that of appropriation to Sales Orders.

This appropriation will quite frequently involve some modification to suit the particular customer, and where these modifications affect more than the final production stages, it is necessary to plan the stock production accordingly.

The scheme of widest application is to issue the Stock Manufacturing Orders for assembled units or groups of parts according to the class of product and the probabilities of sales modifications.

These assembled units will represent the stage in which the product passes into stock to be drawn out later in various combinations of units to make complete products, in accordance with Sales Orders.

Section II g

Official Orders.

Issue of Orders.

The duty of issuing official orders for goods to be despatched or
5-12. work to be put in hand usually falls upon one of the commercial departments, and convenience will dictate the channel to be used.

The Correspondence Office can act with advantage under some circumstances, while in others the Estimating Office will be in much the better position to do this work. It is not uncommon, where orders are numerous, to have a separate Order Department.

The principal point, perhaps, is to have all official orders issued from the same source.

Orders as received from customers will be subject to scrutiny, first as to the credit status of the firm, and secondly, as to any technical or commercial conditions attaching to the order that require consideration. Acknowledgment should be made if goods
5-13. are not despatched the same day.

Of these orders, some will refer to special products, others to standard product or to standard product that can be adapted to the customer's requirements.

Issue of Orders.

The fact that standard products may be sold does not always imply that the goods will be either in stock or in course of manufacture, owing to the wide range of product attempted by many firms in this country.

Standard product that has to be made up for each selling order will require to be treated much the same as special products.

If all standard products are kept in stock, and if no sales of same are made that involve modification of standard design, then and then only will it be feasible to discriminate in the issue of official orders between sales of special product and sales of standard product.

The question of orders for works additions and repairs is considered elsewhere.

Sales Orders.

In the ordinary way, the only division in sales that can be maintained in the official orders will be as between sales of complete product and sales of sundries (including repairs). These divisions may be designated as follows :

Series A—Sales Orders.
„ *B—Sales Repairs and Sundries Orders.*

In the latter series in a business involving the supply of spare parts, with or without the work of fitting same in place, it will be better, if not absolutely necessary, to group such orders in one series, though separation of Sundries from Repairs is well enough, if it can be carried out consistently.

A valuable point may be made in connection with Sales Repair Orders, namely, that no repair work should be completed until a quotation has been submitted to the customer and approved. It would be safer, of course, not to start the repair until estimate is accepted, but policy will prevent too arbitrary a position being taken up. A careful inspection of repairs necessary must precede the making up of the estimate, and such a course is to the advantage of all parties. It is of particular importance where the customer may be reading more into the guarantee, under which he purchased, than was intended.

It will prove very helpful in controlling expenditure on guarantee work if a separate series of orders is used for this purpose. Instead of a separate series a qualifying letter may be given to the orders referring to guarantee, *e.g.* B 690 G.

Production Orders.

While the definition of what constitutes a Sales Order is clear enough, the same can hardly be said of Production Orders.

Where product is made specially for each customer, the sales order may also be the production order. 5·49.

The usual condition is that some of the sales orders will be also

Production Orders. production orders, in that the whole product called for has to be made specially, while the balance of sales will be effected from goods made nominally for stock.

Where sales orders are utilised as production orders it is sufficient distinction to add a letter, say P, thus AP 1001, BP 2457.

Some risk of confusion may possibly arise when a sales order is used as a production order for only the completing stages of any product.

Confusion will be avoided so long as the Stock Manufacturing Orders are arranged so as to only cover the work of production up to the stages when the sales order may be said to operate.

The progressive or identification no. of each item of complete
5-107. product as it appears in the Progressive No. Register will often be a better reference for the concluding stages than the Sales Order Nos. as not being liable to cancellation or alteration. The cross reference in this register must be relied on to identify particular progressives nos. with particular Sales Order Nos.

A subsidiary class of production orders will relate to development and experimental work.

It is quite important that orders of this character should be authorised by the General Manager as tending to control a class of expenditure that so readily runs to waste, although much advantage may result from generous expenditure wisely directed.

An expenditure limit may be placed on some of these orders, with a view to their being referred for further authorisation when the limit is reached.

The term Developments has been associated with that of Experiments to give a wider scope to this series. Such wider scope is valuable as providing a suitable heading for development expenditure, in connection with regular production, that would otherwise have to be included in the net production costs. The point has most application in a strictly manufacturing business and will arise, for the most part, on new lines of product.

Probably only an estimate of those production costs, that ought to be treated as developments, can be attempted, and in such cases an official order in the above series may hardly be of much use—the necessary adjustment being possibly made in the accounts. On the other hand, the total expenditure passing to the *Development and Experiments Account* in the financial books will be more susceptible to control if official orders are issued to cover even these estimated proportions of cost.

The order series for stock manufactures is assumed to be lettered " C " and for developments and experiments to be lettered " D."

SECTION III

WORKS ADMINISTRATION

Works Regulations.

Section IIIa

Regulations affecting Employees.

Works Rules or Regulations, as usually understood, seem to consist mainly of restrictions and penalties. Rules of this character are quite properly disapproved by many managers, if only that so much regulation of conduct is attempted that it is not possible to apply the rules literally. The maintenance of good conduct or reasonable discipline is a matter of supervision; and efficient supervision is not to be achieved by any list of rules.

On the other hand, the Management may wish to regulate the men's conduct in some particular, that would not be embraced by any ordinary code of ethics. A typical case is, perhaps, that of smoking in the Works, and another is that of taking meals in the shops, when a mess-room is provided. It is necessary to publish notices, if any prohibition is to be effected without unfairness.

With a few possible exceptions of this sort, works regulations should not consist of prohibitions, but should be essentially a statement of the routine arrangements with which workmen shall comply.

Established regulations can, of course, be applied to new comers by word of mouth and their own observation, but it is in the interests of all parties to set down in the form of office instructions the permanent routine arrangements and conditions of work. As to what these ought to be only local circumstances can determine, but it is thought that the following draft of representative regulations may be useful to anyone considering the matter in detail.

STANDING OFFICE INSTRUCTIONS CONCERNING EMPLOYEES.

1. TERMS OF ENGAGEMENT.

Every workman is engaged by the hour and paid only for time actually worked.

The engagement may be terminated by either party at any moment and without more than one hour's notice.

In case of dismissal for misconduct no notice whatever will be necessary.

2. ORDINARY WORKING HOURS.

The working week shall consist of 53 hours, arranged as follows:

Monday to Friday, 6 a.m. to 5 p.m. (9½ hrs.).
Saturday, 6 a.m. to 12 noon (5½ hrs.).

2a. ORDINARY MEAL TIMES.

Breakfast - -	8.0 to 8.30 a.m.
(One hour allowed after working all night.)	
Dinner - - -	1 to 2 p.m.
(Saturdays, 12 noon to 1 p.m.).	
Tea (where working more than 2 hrs. overtime) excepting Friday	5 to 5.30 p.m.
Tea, Fridays (Pay Night) - -	5 to 5.45 p.m.
Supper - - -	9.30 to 10.30 p.m.
Early Breakfast -	2.0 to 2.30 a.m.

Regulations affecting Employees.

3. Overtime.

Overtime allowances will only be paid after a full ordinary day has been worked (see Regulation No. 2).

Time and Quarter Rate will be paid for the first two hours overtime and Time and Half Rate afterwards.

Unless the whole department is working overtime, each man's overtime must be authorised by an Overtime Ticket from the foreman, and this ticket must be given to the Gatekeeper—otherwise overtime will not be paid for.

Overtime on Saturday afternoons for shop cleaning purposes must terminate at 4 p.m.

Workmen will not be expected to work more than 32 hours overtime in any four consecutive weeks, except in the following cases:

I.—Repairs or Replace Work of any kind.

II.—Making up time lost through breakdown of plant.

3a. Night Shift.

Night Shift hours will be arranged as follows:

7 p.m. to 6 a.m.

Men taking over machines worked by juniors during day may have to start at 6 p.m.

Meal Hours, 9.30 to 10.30 p.m. and 2.0 to 2.30 a.m.

Payment will be made at Time and Quarter Rate for all hours worked up to 6 a.m. when bare time recommences.

When a Night Shift is being worked, each man must continue working until relieved by the proper man appointed for the succeeding shift, or, in his absence, by a substitute arranged by the foreman. If not relieved in this way, work may only be discontinued by permission of the foreman.

The change from Day Shift to Night Shift, and *vice versa*, will usually take effect on Mondays, but should a workman be called upon to change on any other day, working continuously, the Rate of Time and Quarter will be paid after the full day's hours have been worked.

3b. Working on Sundays and Public Holidays.

Double Time Rate will be paid for working on Sundays and Christmas Day.

Time and Quarter Rate will be paid for working on the following days:

Easter Monday.	Whit Monday.
August Bank Holiday.	Boxing Day.

The Time and Half Rate will not commence until 11½ hours have been worked.

4. Time Recording.

Mechanical Time Recorders are provided throughout the Works, and all workmen are required to register, or stamp, on their time card at the proper recorder on the following occasions:

Time "IN" at the commencement of each day (or night), and on resuming work after each meal.

Time "OUT" when stopping work for the day (or night).

When registering, each workman must take the time card bearing his number from the first rack, and, after stamping the card, place it in the second rack under the correct number.

NO EMPLOYEE MAY RECORD ANYONE'S TIME BUT HIS OWN. Anyone infringing this rule will be liable to instant dismissal.

The racks containing the time cards are opened fifteen minutes before the time for commencing work.

Only Recorder Time Stampings will be recognised.

Omission to stamp on the proper occasion renders the workman liable to a fine of one hour's pay on the second occurrence in any six months.

Men working meal times will not be required to register on the time recorder for that time, but must get their Time Card signed accordingly by their foreman, who must state the reason for working.

Men leaving work at other than the usual hours must obtain a Pass Out Ticket from the Foreman, and this must be given up to the Gatekeeper.

The Works Gates are closed punctually at each starting time, and two minutes' grace is allowed at the time recorders, when same will be locked.

5. Lost Time.

Lost Time will be considered from day to day, and suspension or discharge made in cases of bad timekeeping.

5a. Absence without Leave.

If prompt explanation of absence is not sent in writing to their foreman, the absentee will be considered to have left.

The foreman will send on the note to the Wages Office.

A Medical Certificate should be sent in cases of illness lasting two days.

Other explanations of absence will be considered in conjunction with the Absentee's Lost Time Record.

6. Works Holidays.

The usual Works Holidays are as follows:

Easter—Good Friday, Saturday and Easter Monday.

Whitsuntide—Whit-Monday.

Summer Holiday—Ten consecutive days, viz.: Saturday before August Bank Holiday until the Monday after (inclusive).

Christmas—Christmas Day and Boxing Day.

These may be varied to suit the Company's requirements, when notices will be posted accordingly.

Pay will usually be made at the normal closing hour on the day preceding a holiday, when overtime will only be worked in exceptional cases.

Work will be resumed at 6 a.m. after any holiday unless special instructions are issued to the contrary.

7. Payment of Wages.

Each week's time, both Day Shift and Night Shift, is made up to 6 *a.m.* Thursday, and payment is made at 5 p.m. Friday (Night Shift at 6.45 p.m. Fridays).

In making up the time for the week, any fraction less than one-eighth of an hour, remaining in the total, will not be paid for.

Time Wages are computed to the nearest halfpenny.

The completed time card is re-issued as a Pay Card, with the total hours filled in, on Fridays, to the men working that day.

The amount of pay is noted on the pay ticket inside each pay tin.

The Pay Card has to be given up in exchange for the pay tin.

Payment for Away Time will be made up separately from Works Time and the envelope containing this pay will be placed in the pay tin.

The respective Pay Stations for each department are indicated on boards hung at each Time Recorder.

Paying is not commenced until three

Regulations affecting Employees

minutes past 5 p.m., to allow time for men to line up properly in order of departments and in order of numbers. Men out of proper order will have to wait until the whole pay has been gone through once.

New men will be paid the first week at the end of the list, that is, after the pay has been gone through once. They will take their proper place according to Check number in succeeding weeks.

The order in which the several departments using any Pay Station will be varied each week according to a notice posted at the Pay Station.

Any difference in the amount actually received must be reported at the time to the clerk in attendance outside each Pay Station.

Enquiries as to Time Wages should be made personally at the Wages Office before 5.15 p.m. on Fridays, and will not be allowed during working hours, except through the Department Foreman.

Men absent on Fridays must refer to the Wages Office to claim their pay.

Pay not claimed on Fridays may be drawn on Saturdays between 12 noon and 12.15 p.m., or, in the case of men absent through sickness, on any evening betwen 5 and 5.15 p.m. on application at the Wages Office.

Pay not drawn at the ordinary time will have to be signed for.

Men unable to claim their pay in person must send a letter authorising some other person to draw the money. No money will be paid over to a third party, whether a relative or not, without written instructions to do so. In cases of serious illness some convenient arrangement will be made by the Wages Office.

7a. INSURANCE CARDS.

Insurance Cards will be held in the Wages Office, and duly stamped each week with the stamp representing the Employers' and the Employees' contribution. At the end of each insurance period, or on leaving, the cards will be returned to the respective employees. New period cards must be handed in as quickly as possible.

Men may see or borrow their cards at 5 p.m. any day; a receipt will be required when a card is borrowed.

7b. HOSPITAL CONTRIBUTIONS.

So long as employees are willing to contribute to the Hospitals, facilities will be afforded by the Firm as to the collection of subscriptions by deduction from the wages. Each Department will select two Committee Members, one either the Foreman or Assistant Foreman, and the other a workman, to serve on the Hospital Committee for obtaining promises to contribute and settling the disposal of funds and allocation of Hospital Letters.

8. EXTRA PAY.

As far as possible, extra pay is made according to the time or money saved by a workman through his energy and skill.

In the instances where the Piecework System applies, a piece price is fixed for each job, and the balance between the time wages on the job and the piece price is paid to the workman.

With the Premium System, as extensively used in these Works, a Time Limit is fixed for the respective jobs, and the time actually taken on the work is compared with the Time Limit. One half of the time saved is then calculated at the man's hourly wages rate and paid to him as a premium or bonus.

The Time Limit is arrived at quite differently from a Piece Price, and the two cannot be compared.

The Time Limit is made up of a Starting or Preparation Allowance for each batch of parts to be made, and for re-starts, with Operating Times for each piece done added thereto.

Overtime allowances are not counted against the Piece Prices in the Piecework System, or against the Time Limits in the Premium System.

Day Rates or Time Wages are guaranteed in all cases and each job will stand alone, unless specially provided for. The losses will not be set against the gains.

Junior's time (*i.e.* Youth's under 18 years), will be counted against the Time Limit in the following proportions:

For rates at 2d. per hour and under—half time counted.

For rates at 4d. and above 2d. per hour—three quarters of time counted.

First year apprentices are not eligible for premium work when working alone, and their time will not count against the Time Limit when working with a mechanic except under special circumstances.

If defects in material or errors in drawings or faults in previous operations become apparent before the work is finished, they must be at once reported to the foreman and the time spent on the defective piece will be allowed to count as day work. If, however, the defect is not pointed out as soon as it could have been seen, then no allowance will be made in respect to any of the time.

Work not passed as correct at the first inspection will be dealt with on its merits, and, if correction is possible, the wages cost, either actual or estimated, of the correction will be deducted from the Extra Pay otherwise due.

The Management reserve the right to stop all Extra Pay on careless workmanship, whether the work can be utilised or not.

Time Limits and Piece Prices will only be altered as a consequence of a change of process or operating equipment.

No limit is placed on the amount of Extra Pay that may be earned by any man.

Extra Pay is due for payment the week following the completion of the job.

Particulars of these payments will appear on the current Pay Card.

Extra Pay due to men leaving (not made up at time of leaving) will be forwarded by post on the Monday after it becomes due, if instructions be left at the Wages Office.

Extra Pay enquiries can only be dealt with on Monday nights at 5 p.m., unless made through the Department Foreman.

9. TOOLS AND DRAWINGS.

Any workman failing to comply with any Rules made regarding the return of Tools and Drawings to the proper Stores will be liable to suspension until satisfactory explanation has been given.

Workmen losing tools or breaking same without good cause, are liable to have the half cost of same deducted from their Extra Pay.

When leaving the firm's employ or drawing all lying or back time, a Tool Clearance Receipt must be obtained from the Department Tool Stores, and handed in at the Wages Office before pay will be made. Tool Checks that cannot be accounted for will be charged at one penny each, and Tool Books at one shilling each, and the amount deducted from the wages due. Any such deductions will be duly refunded on the return of the missing items.

The Company will afford facilities to men desirous of providing themselves with private tools at trade prices, and by instalments. Particulars may be obtained at the Wages Office.

Regulations affecting Employees.

10. Suggestions.

Original suggestions as to improved methods may be submitted to the Works Manager by letter. Due recognition will be made of suggestions which can be utilised.

11. Accidents.

Anyone meeting with an accident in the Works will be given first aid at the Gatehouse.

The Gatekeeper will report all accidents coming to his knowledge.

In the case of minor accidents not involving first aid, the injured man should personally report the matter to his foreman as early as possible.

Claims for compensation must be made to the Wages Office.

12. Prevention of Accidents.

No moving part of any machinery is, on any account, to be cleaned or wiped down while in motion.

Workmen are strictly prohibited from putting on Main Belts or Driving Belts between Main Shaft and Counter Shaft, or doing work on Main Shafting unless the Engine is stopped or slowed down. The repair and putting on of Main Belts is to be done only by the Beltman.

Workmen when wearing any loose jacket or sleeve, or any loose garment of any kind, are specially cautioned against the danger or working at, or in close proximity to, any machinery in motion, or which is liable to be put in motion.

Workmen having occasion to remove any guard or fence from any Machine or Belt must do so when the machinery is at rest; and must replace the guard or fence before re-starting the Machine or Belt.

Workmen using any Machinery, Machine, Tool or Appliance of any description must report without delay to the foreman in charge any apparent or suspected defect or danger.

Workmen are prohibited from standing or passing unnecessarily underneath suspended loads or walking under travelling loads. Those engaged in the lifting or moving of loads by crane or otherwise are, in all cases, to give distinct warning to others, who may be too near, to keep clear. Special care is to be taken in the selection and fitting of Slings, Chains, Ropes, and any Tackle for lifting loads, and only such are to be used as are of ample strength for the purpose.

Machines must at all times be sufficiently clean to allow of all necessary wiping down to be done only after machinery is stopped at 11.50 a.m. on Saturdays.

12a. Smoking.

Smoking is strictly prohibited within the Works buildings, other than the Mess Room, as a precaution against fire. The prohibition holds good day and night, week ends and holidays.

A fine of sixpence will be inflicted for each offence.

Any authorised exception to this rule will only permit the smoking of a pipe. Under no circumstances will cigarette smoking be tolerated in the Works.

12b. Fire Alarm.

If fire is detected by any employee, he should with all haste inform the Gatekeeper, who will call out the Works Fire Brigade. The informant will then do what he can to check the fire pending the arrival of the firemen, when he will only assist if requested by the Officer-in-Charge.

13. General Facilities.

A Mess Room is provided for meals, and the Attendant in charge is authorised to charge 1d. per week to each man using the Mess Room.

For this payment a brass check will be issued entitling the holder to borrow plate and drinking cup for each meal.

Meals will be heated free of charge if left at the Mess Room before starting work.

Access to the Mess Room during working hours is strictly barred to all, and messengers may not be sent.

A Cycle Shelter is also provided, and may be used on payment of a penny per week to the Attendant.

The Firm accept no responsibility for wanton damage or theft, but insure against fire up to a certain limit. Each man on lodging his machine must obtain a brass check from the Attendant corresponding with the stall number to be used, and return same on claiming the machine. This precaution is in the interests of the employee, and is essential for establishing a claim in the event of fire.

The Cycle Shelter is open fifteen minutes before each starting time.

Hat and Coat Hooks are provided for each employee inside the shops.

No baskets or bags may be taken in the shop and must be lodged at the Mess Room if brought into the Works at all.

All departments are closed during meal hours from five minutes past the leaving time to within ten minutes of the starting time.

Relatives or messengers bringing meals to workmen are not allowed inside the Works beyond the Gatehouse barrier.

14. Fines.

All fines and unclaimed pay of over three months' standing will be handed over to the Works Hospital Committee to be disposed of at their discretion.

15. Employment away from the Works.

When men are employed away from the Works reasonable time, or money payment, will be allowed for journeying to and from their work.

If employed more than one mile away from the Works the following allowance will be made to those in receipt of hourly wages:

For periods of less than 24 *hours* (if not returned to the Works within one hour of Works meal times),
Breakfast, 9d. Dinner, 1/-. Tea, 6d.

For periods of less than 7 *days.*
3/- per 24 hours.

For periods exceeding 7 *days.*
17/6 per week.

Meals on train.
When train journey exceeds 6 hours, a meal allowance of 3/- will be paid, and after that period the allowances as above will apply.

Fares. Third Class.

Travelling Time.
Travelling time will be paid as bare time and will only be allowed at the beginning and end of job unless ordered home previously.

Accommodation provided by the Company.
When meals or lodgings are provided by the Company, the respective allowances will not be paid.

Exceptional Expenses.
Variations from the above allowances will be duly considered by the Works Manager on production of vouchers. Cab fares can only be allowed under special circumstances.

Regulations affecting Employees

Payment in advance.

When an employee is sent away he will receive his return fare and allowances according to above scale up to and including the following Wednesday night. This money is to be accounted for on the Away Time Sheet that has to be rendered each Wednesday night, and the next week's allowance will be sent with his wages. Exceptional expenses must be reported with ordinary expenses but no details are required of the expenditure of allowances due according to these rules.

16. CHANGE OF ADDRESS.

Each man should advise his foreman of any change of address in case of emergency. The Company will not, however, furnish addresses of employees to any outside party.

17. Any employee or group of employees lending money for gain to fellow-workers will be liable to instant dismissal.

Reference copies of the standing instructions, on the lines of the foregoing, should be supplied to each foreman.

Sometimes copies of such regulations are printed in booklet form for issue to the workmen. In any case, if any personal notice to the men is necessary—apart from what they may learn from their foreman and associates, a booklet will be much more effective than a printed notice placarded on the factory walls.

An abbreviated edition, stating particularly all penalties, may be printed on the cover of the Tool Book (5-92).

In the matter of fines, due regard must be paid to the legal obligation laid on employers by the Truck Act, 1896, of which the following notes have been taken from the Factory Abstract which has to be affixed in every Factory.

Note as to the Truck Act, 1896.

All fines, or deductions or charges in respect of (*a*) bad work or (*b*) damaged goods or (*c*) materials or articles to be used in relation to the work, are illegal unless made in pursuance of a contract between the employer and the worker. The contract must be in writing and signed by each worker, or else contained in a Notice affixed in the factory; and a copy must be given to each worker when the contract is made.

In the case of fines, the contract must specify clearly the matter in respect of which a fine may be imposed, and the amount of the fine.

In the case of materials or articles used in relation to the work, the charge must not exceed the cost thereof to the employer.

No fine or deduction or charge (nor any contract respecting the same) is legal unless it is fair and reasonable.

Written particulars must be given to the worker on each occasion when a fine or deduction or charge is made.

A register of all fines imposed must be kept. The contract and register must be produced on demand of H.M. Inspectors.

A copy of the contract must be given to any worker on demand.

Referring to Hospital Contributions, the extension of some of the Hospital Saturday Funds to provide dental and optical treatment, and also surgical instruments at specially low rates, to be paid for by instalments, is especially to be commended.

A passing reference may be made to latrines, as a certain amount of discipline is essential. In the larger works, there is usually a Latrine Attendant, and a timing of employees in and out to check abuse. Considerations of hygiene and the men's self-respect will justify the provision of modern conveniences. It will be desirable to prohibit reading and to provide sanitary paper. By having the foremen's latrines in the same building, presumably a special detached one, the necessity for an attendant in continuous attendance may be avoided.

Factory Act Requirements.

The responsibilities of works managers under the Factory and Workshop Act, 1901, will be sufficiently indicated for the present purpose by the following extracts, which are of fairly general application to at least non-textile factories. The Act needs to be consulted in regard to saving clauses and application of the Act in directions not covered by the extracts.

Extracts from Factory and Workshop Act, 1901.

For the purpose of securing the observance of the requirements as to cleanliness in factories, all the inside walls of the rooms of a factory, and all the ceilings or tops of those rooms . . . and all the passages and staircases of a factory, if they have not been painted with oil or varnished once at least within seven years, shall (subject to any special exceptions made in pursuance of this section) be limewashed once at least within every fourteen months, to date from the time when they were last limewashed ; and if they have been so painted or varnished shall be washed with hot water and soap once at least within every fourteen months, to date from the time when they were last washed.

A factory shall . . . be deemed to be so overcrowded as to be dangerous or injurious to the health of the persons employed therein, if the number of cubic feet of space in any room therein bears to the number of persons employed at one time in the room a proportion less than two hundred and fifty, or, during any period of overtime, four hundred, cubic feet of space to every person.

There shall be affixed in every factory and workshop a notice specifying the number of persons who may be employed in each room of the factory or workshop by virtue of this section.

In every factory and workshop adequate measures must be taken for securing and maintaining a reasonable temperature in each room in which any person is employed, but the measures so taken must not interfere with the purity of the air of any room in which any person is employed.

In every room in any factory or workshop sufficient means of ventilation shall be provided, and sufficient ventilation shall be maintained.

In every factory or workshop or part thereof in which any process is carried on which renders the floor liable to be wet to such an extent that the wet is capable of being removed by drainage, adequate means shall be provided for draining off the wet.

Every factory and workshop must be provided with sufficient and suitable accommodation in the way of sanitary conveniences, regard being had to the number of persons employed in or in attendance at the factory or workshop, and also where persons of both sexes are or are intended to be employed or in attendance, with proper separate accommodation for persons of each sex. The Secretary of State shall, by Special Order, determine what is sufficient and suitable accommodation within the meaning of this section.

> The Sanitary Accommodation Order of 4th February, 1903, contains the following rule :
>
> In factories or workshops where males are employed or in attendance there shall be one sanitary convenience for every 25 males ; provided that—
>
> (*a*) in factories or workshops where the number of males employed or in attendance exceeds 100, and sufficient urinal accommodation is also provided, it shall be sufficient if there is one sanitary convenience for every 25 males up to the first 100, and one for every 40 after ;
>
> (*b*) in factories or workshops where the number of males employed or in attendance exceeds 500, and the District Inspector of Factories certifies in writing that by means of a check system, or otherwise, proper supervision and control in regard to the use of the conveniences are exercised by officers specially appointed for that purpose, it shall be sufficient if one sanitary convenience is provided for every 60 males, in addition to sufficient urinal accommodation. Any certificate given by an Inspector shall be kept attached to the general register, and shall be liable at any time to be revoked by notice in writing from the Inspector.

With respect to the fencing of machinery in a factory the following provisions shall have effect :

(*a*) Every hoist or teagle, and every fly-wheel directly connected with the steam or water or other mechanical power, whether in the engine-house or not, and every part of any water wheel or engine worked by any such power, must be securely fenced ; and

(*b*) Every wheel-race not otherwise secured must be securely fenced close to the edge of the wheel-race ; and

(*c*) All dangerous parts of the machinery, and every part of the mill gearing, must either be securely fenced, or be in such position or of such construction as to be equally safe to every person employed or working in the factory as it would be if it were securely fenced ; and

(*d*) All fencing must be constantly maintained in an efficient state while the parts required to be fenced are in motion or use, except where they are under repair or under examination in connection with repair or are necessarily exposed for the purpose of cleaning or lubricating or for altering the gearing or arrangements of the parts of the machine.

Every steam boiler used for generating steam in a factory or workshop, or in any place to which any of the provisions of this Act apply, must, whether separate or one of a range—

(*a*) have attached to it a proper safety valve and a proper steam gauge and water gauge to show the pressure of steam and the height of water in the boiler ; and

(*b*) be examined thoroughly by a competent person at least once in every fourteen months.

A report of the result of every such examination in the prescribed form, containing the prescribed particulars, shall within fourteen days be entered into or attached to the general

Factory Act Requirements.

register of the factory or workshop, and the report shall be signed by the person making the examination, and, if that person is an inspector of a boiler-inspecting company or association, by the chief engineer of the company or association.

In a factory . . . the traversing carriage of any self-acting machine must not be allowed to run out within a distance of eighteen inches from any fixed structure not being part of the machine, if the space over which it runs out is a space over which any person is liable to pass, whether in the course of his employment or otherwise.

A young person must not be allowed to clean any dangerous part of the machinery in a factory while the machinery is in motion by the aid of steam, water, or other mechanical power; and for this purpose such parts of the machinery shall, unless the contrary is proved, be presumed to be dangerous as are so notified by an inspector to the occupier of the factory.

Every factory . . . in which more than forty persons are employed must be furnished with a certificate from the district council of the district in which the factory or workshop is situate that the factory or workshop is provided with such means of escape in case of fire for the persons employed therein as can reasonably be required under the circumstances of each case.

The means of escape in case of fire provided in any factory or workshop shall be maintained in good condition and free from obstruction.

While any person employed in a factory or workshop is within the factory or workshop for the purpose of employment or meals, the doors of the factory or workshop, and of any room therein in which any such person is, must not be locked or bolted or fastened in such a manner that they cannot be easily and immediately opened from the inside.

In every factory or workshop . . . the doors of each room in which more persons than ten are employed, shall, except, in the case of sliding doors, be constructed so as to open outwards.

With respect to the employment of women and young persons in a non-textile factory, and a workshop, the following regulations shall be observed:

(1) The period of employment, except on Saturday, shall (save as is in this Act specially excepted) either begin at six o'clock in the morning and end at six o'clock in the evening, or begin at seven o'clock in the morning and end at seven o'clock in the evening, or begin at eight o'clock in the morning and end at eight o'clock in the evening.

(2) The period of employment on Saturday shall (save as is in this Act specially excepted) begin at six o'clock in the morning and end at two o'clock in the afternoon, or begin at seven o'clock in the morning and end at three o'clock in the afternoon, or begin at eight o'clock in the morning and end at four o'clock in the afternoon.

(3) There shall be allowed for meals during the said period of employment in the factory or workshop—

(*a*) on every day except Saturday not less than one hour and a half, of which one hour at the least, either at the same time or at different times, shall be before three o'clock in the afternoon; and

(*b*) on Saturday not less than half an hour.

(4) A woman or a young person in a non-textile factory and a young person in a workshop shall not be employed continuously for more than five hours without an interval of at least half an hour for a meal.

Subject to any special exceptions made by or in pursuance of this Act, the occupier of a factory or workshop shall allow in each year to every woman, young person, and child employed in the factory or workshop the following holidays:

In England there shall be allowed as whole holidays—

Christmas Day, Good Friday, and every Bank holiday, unless, in lieu of any of those days, another whole holiday or two half holidays, fixed by the occupier, be allowed.

An occupier of a factory or workshop, not less than seven days before he avails himself of any special exception made by or in pursuance of this Act, shall serve on the inspector for the district, and affix in his factory or workshop, notice of his intention so to avail himself, and whilst he avails himself of the exception shall keep the notice so affixed.

A child under the age of twelve years must not be employed in a factory or workshop.

In a factory a young person under the age of sixteen years or a child must not be employed for more than seven, or if the certifying surgeon for the district resides more than three miles from the factory thirteen, work days, unless the occupier of the factory has obtained a certificate, in the prescribed form, of the fitness of the young person or child for employment in that factory.

When a child becomes a young person a fresh certificate of fitness must be obtained.

When a child of the age of thirteen years has obtained from a person authorised by the Board of Education a certificate of having attained such standard of proficiency in reading, writing, and arithmetic, or such standard of previous due attendance at a certified efficient school as is mentioned in this section, that child shall be deemed to be a young person for the purposes of this Act.

Printed copies of all regulations for the time being in force under this Act in any factory or workshop shall be kept posted up in legible characters in conspicuous places in the factory or workshop where they may be conveniently read by the persons employed.

A printed copy of all such regulations shall be given by the occupier to any person affected thereby on his or her application.

If the occupier of any factory or workshop fails to comply with any provision of this section as to posting up or giving copies, he shall be liable to a fine not exceeding ten pounds.

Every person who pulls down, injures, or defaces any regulations posted up in pursuance of this Act, or any notice posted up in pursuance of the regulations, shall be liable to a fine not exceeding five pounds.

An inspector shall, for the purpose of the execution of this Act, have power to do all or any of the following things; namely,—

(*a*) To enter, inspect, and examine at all reasonable times, by day and night, a factory and a workshop, and every part thereof, when he has reasonable cause to believe that any person is employed therein, and to enter by day any place which he has reasonable cause to believe to be a factory or workshop; and

(*b*) To take with him in either case a constable into a factory or workshop in which he has reasonable cause to apprehend any serious obstruction in the execution of his duty; and

Factory Act Requirements.

(*c*) To require the production of the registers, certificates, notices, and documents kept in pursuance of this Act, and to inspect, examine, and copy the same ; and

(*d*) To make such examination and inquiry as may be necessary to ascertain whether the enactments for the time being in force relating to public health and the enactments of this Act are complied with, so far as respects the factory or workshop and the persons employed therein ; and

(*e*) To enter any school in which he has reasonable cause to believe that children employed in a factory or workshop are for the time being educated ; and

(*f*) To examine, either alone or in the presence of any other person, as he thinks fit, with respect to matters under this Act, every person whom he finds in a factory or workshop or such a school as aforesaid, or whom he has reasonable cause to believe to be or to have been within the preceding two months employed in a factory or workshop, and to require every such person to be so examined and to sign a declaration of the truth of the matters respecting which he is so examined ; and

(*g*) To exercise such other powers as may be necessary for carrying this Act into effect.

Every inspector shall be furnished with the prescribed certificate of his appointment, and on applying for admission to a factory or workshop shall, if so required, produce the said certificate to the occupier.

Every person shall, within one month after he begins to occupy a factory or workshop, serve on the inspector for the district a written notice containing the name of the factory or workshop, the place where it is situate, the address to which he desires his letters to be addressed, the nature of the work, the nature and amount of the moving power therein, and the name of the person or firm under which the business of the factory or workshop is to be carried on.

There shall be affixed at the entrance of every factory and workshop, and in such other parts thereof as an inspector for the time being directs ; and be constantly kept so affixed in the prescribed form and in such position as to be easily read by the persons employed in the factory or workshop—

(*a*) The prescribed abstract of this Act ; and

(*b*) A notice of the name and address of the prescribed inspector ; and

(*c*) A notice of the name and address of the certifying surgeon for the district ; and

(*d*) A notice of the clock (if any) by which the period of employment and times for meals in the factory or workshop are regulated ; and

(*e*) Every notice and document required by this Act to be affixed in the factory or workshop.

In every factory and workshop there shall be kept a register, called the general register, showing in the prescribed form the prescribed particulars as to—

(*a*) the children and young persons employed in the factory or workshop ; and

(*b*) the lime-washing of the factory or workshop ; and

(*c*) every accident occurring in the factory or workshop of which notice is required to be sent to an inspector ; and

(*d*) every special exception of which the occupier of the factory or workshop avails himself ; and

(*e*) such other matters as may be prescribed.

Where the age of any young person under the age of sixteen years or child is required to be ascertained or proved for the purposes of this Act, or for any purpose connected with the employment in labour or elementary education of the young person or child, any person shall on presenting a written requisition in such form and containing such particulars as may be from time to time prescribed by the Local Government Board, and on payment of a fee of sixpence, be entitled to obtain a certified copy under the hand of a registrar or superintendent registrar of the entry in the register, under the Births and Deaths Registration Acts, 1836 to 1874, of the birth of that young person or child ; and such form of requisition shall on request be supplied without charge by every superintendent registrar and registrar of births, deaths, and marriages.

If a factory or workshop is not kept in conformity with this Act, the occupier thereof shall be liable to a fine not exceeding ten pounds, and, in the case of a second or subsequent conviction in relation to a factory within two years from the last conviction for the same offence, not less than one pound for each offence.

Where an offence for which the occupier of a factory or workshop is liable under this Act to a fine has in fact been committed by some agent, servant, workman, or other person, that agent, servant, workman, or other person, shall be liable to the like fine as if he were the occupier.

The expression " child " means a person who is under the age of fourteen years, and who has not, being of the age of thirteen years, obtained the certificate of proficiency or attendance at school mentioned in Part III. of this Act.

The expression " young person " means a person who has ceased to be a child and is under the age of eighteen years.

FEES OF CERTIFYING SURGEONS.

Fees on Examination for Certificates of Fitness for Employment.

When the examination is at the factory or workshop - - - - - - -	2s. 6d. for each visit, and 6d. for each person after the first five examined at that visit ; and also if the factory or workshop is more than one mile from the surgeon's residence, 6d. for each complete half mile over and above the mile.
When the examination is not at the factory or workshop, but at the residence of the surgeon, or at some place appointed by the surgeon for the purpose, and that place as well as the day and hour appointed for the purpose has been published in the prescribed manner - - - - - -	6d. for each person examined.

Factory Act Requirements.

SCHEDULE VI.—LIST OF NON-TEXTILE FACTORIES.

1. Print works.
2. Bleaching and Dyeing works.
3. Earthenware works.
4. Lucifer-match works.
5. Percussion-cap works.
6. Cartridge works.
7. Paper-staining works.
8. Fustian-cutting works.
9. Blast furnaces.
10. Copper mills.
11. Iron mills.
12. Foundries.
13. Metal and india-rubber works.
14. Paper mills.
15. Glass works.
16. Tobacco factories.
17. Letterpress printing works.
18. Bookbinding works.
19. Flax scutch mills.
20. Electrical stations.
21. Hat works.
22. Rope works.
23. Bakehouses.
24. Lace warehouses.
25. Shipbuilding yards.
26. Quarries.
27. Pit-banks.
28. Dry-cleaning, carpet-beating and bottle-washing works.

According to the latest returns * available which refer to 1912, the number of factories under inspection is as follows:

	TOTAL.	No. Registered during Year.		Net Increase During Year.
		Added.	Removed.	
Textile Factories -	8,271	321	251	70
Non-Textile Factories	109,004	7,624	4,861	2,763

Accidents.

The question of accidents to workmen is unfortunately serious in most works, both from the point of view of the injured and of the employer. Some works employ a matron for visiting sick and accident cases. If women are employed, the necessity of so doing is beyond doubt, and it pays.

A well-equipped ambulance service is in the interests of both parties, and a proper ambulance room might be advantageously included in the Gatehouse. In that event, and preferably in any event, the Gatekeeper should be qualified to render first-aid.

A valuable instruction in this connection is as follows:

1. Tincture of Iodine to be freely swabbed over wound with cotton wool.
2. Clean gauze to be placed on wound.
3. Bandages to be applied.

NO WATER OR LOTION TO BE USED.

Following from such an arrangement the Gatekeeper can so readily report all cases of first-aid rendered, indicating those passed on for medical treatment or sent home. The Gatekeeper's reports should pass to the Wages Office, on whom must rest the responsibility of furnishing the official reports as required by the Home Office authorities and advising the Insurance Company.

To a large extent the Departmental Foremen are best qualified to supply the details requisite for these reports, and the matter is one to be arranged by the Wages Office.

There may be accidents of seemingly trifling character that will elude these arrangements for getting reported. Eye cases are those most likely to lead to unexpected developments. All that can very well be done is to instruct the men to tell their foreman even of

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* Annual Report of Chief Inspector of Factories and Workshops for the year 1912.

Accidents.

these seemingly minor cases, and leave it to the foreman's judgment
5-38. as to making out an Accident Report.

All Accident Reports will need to be signed by the foreman-in-charge, and be passed by the Works Manager. The report form should provide for the information required by both the Home Office and the Insurance Company, and should provide for indicating the dates when the various reports are sent off.

The Home Office requirements in this matter are indicated in the following extract.

Extract from Notice of Accidents Act, 1906.

(1) Where any accident occurs in a factory or workshop which is either—

(*a*) an accident causing loss of life to a person employed in the factory or workshop; or

(*b*) an accident due to any machinery moved by mechanical power, or to molten metal, hot liquid, explosion, escape of gas or steam, or to electricity, and so disabling any person employed in the factory or workshop as to cause him to be absent throughout at least one whole day from his ordinary work; or

(*c*) an accident due to any other special cause which the Secretary of State may specify by order, and causing such disablement as aforesaid; or

(*d*) an accident disabling for more than seven days a person employed in the factory or workshop from working at his ordinary work,

written notice of the accident, in such form and accompanied by such particulars as the Secretary of State prescribes, shall forthwith be sent to the inspector of the district and also in the case of the accidents mentioned in paragraphs (*a*) and (*b*) of this subsection, and (if the order of the Secretary of State specifying the special cause so requires) of accidents mentioned in paragraph (*c*), to the certifying surgeon of the district.

(2) If any accident causing disablement is notified under this section, and after notification thereof results in the death of the person disabled, notice in writing of the death shall be sent to the inspector as soon as the death comes to the knowledge of the occupier of the factory or workshop.

In the matter of the meaning of the expression, in clause (*b*) above, as to absence "throughout at least one whole day from his ordinary work," this has been laid down as meaning "one whole working day after that on which the accident occurred."

All accidents must be entered in the Factory General Register (Home Office).

The latest returns available of accidents reported under the Factory and Workshop Acts (including the Notice of Accidents Act) give the following figures:

Factory and Workshop Acts.

Year.	Factories and Workshops.	Docks, Wharves, and Quays.	Buildings.	Other Works.
1912	Killed.			
	945	183	114	18
	Injured.			
	142,929	9,481	1,859	703

The responsibilities of employers in regard to compensation are briefly as follows : **Accidents.**

The Workmen's Compensation Act, 1906, provides for the payment by the employer to workmen injured in his service (or in the service of any Sub-contractor employed by him on work undertaken by him) compensation as follows :

IN CASE OF DEATH, where the deceased leaves persons dependent upon his earnings at the time of his death, *three years' earnings*, not less than £150, nor more than £300.
When there are no dependents, a sum for medical and funeral expenses not exceeding £10.

DURING TOTAL DISABLEMENT :

If under 21 years of age, full wages up to 10s. per week.
If over 21 years of age, half wages, not exceeding 20s. per week.
Payable after the first week, or from the first day of disablement if the period is 14 days or longer.

IN THE EVENT OF THE INJURY BEING PERMANENT, THE FOREGOING COMPENSATION WOULD REQUIRE TO BE PAID FOR THE WHOLE TERM OF LIFE.

INDUSTRIAL DISEASES :

In the event of disability arising from specific diseases due to the nature of the employment, compensation has to be paid as if a personal injury by accident had been sustained.

The premiums are calculated upon the annual wages expenditure of the employer. Payment is made on an estimate at the beginning of the year and adjusted on the renewal of the policy.

The Employer is responsible also for rendering an annual return of all accidents and compensation paid, except where he is insured with an insurance company which has arranged to make this return on the employer's behalf.

The latest returns available of compensation under the Workmen's Compensation Act, 1906, and the Employers' Liability Act, 1880, give the following figures :

YEAR 1912.

INDUSTRY.	NUMBER OF PERSONS EMPLOYED.	TOTAL COMPENSATION PAID.	CHARGE PER PERSON EMPLOYED.
		£	£ s. d.
Shipping - - -	254,398	201,329	0 15 9
Factories - - -	5,250,431	1,312,811	0 5 0
Docks - - - -	158,598	169,704	1 1 4
Mines - - - -	1,086,113	1,185,727	1 1 10
Quarries - - -	84,703	47,813	0 11 3
Constructional Work -	115,218	66,805	0 11 7
Railways - - -	461,544	189,912	0 8 2
Total - -	7,411,005	3,174,101	0 8 7

The above figures represent only the actual amount paid to workmen or their dependants under the Act. The total charge, when legal, medical and insurance management expenses are added, is thought to be little short of £5,000,000.

Accidents.

Regulation No. 12 for Prevention of Accidents is based on the placard issued by the Iron Trades Employers Insurance Association, Ltd., who issue also adhesive labels for affixing to machines worded as follows :

> GUARDS.
>
> The Guard MUST NOT BE REMOVED from this machine till it is stopped.
>
> The Guard MUST BE REPLACED before the machine is re-started.
>
> Any workman infringing this rule does so at his own risk, and subjects himself to instant dismissal.
>
> No workman is to attempt to clean any machine while it is in motion.
>
> BY ORDER.

Fire Precautions.

The importance of adequate precautions being taken against fire needs little emphasis.

The desirability of regular fire drill for all hands will depend largely on local circumstances and the lay-out of the Works, but there is little doubt of the necessity for a Works Fire Brigade in the majority of cases.

The Jury, at a Fire Inquest by the City of London Coroner on Jan. 27th, 1913, added the following recommendation to their verdict :

" That Fire Drill be made compulsory in all Factories, without regard to the number of hands employed."

The inauguration of a Works Fire Brigade does not necessarily entail the acquisition of all the paraphernalia of a public fire brigade. The Works Brigade is likely to do valuable work in fighting small fires arising from electrical causes, as to which Insurance Companies aim to absolve themselves from liability, as to the electrical apparatus itself.

The following set of rules will be found useful in running a Works Fire Brigade :

W. BLANK & CO., LTD.
Efficiency Works, Main Road, LONDON.

WORKS FIRE BRIGADE.

The following Rules are intended for the general organisation of the Fire Brigade, which will consist of a Chief Officer, Second Officer, Engineer, and ten Firemen, under the control of Mr..........., Captain of the Brigade. Each Member will be supplied with a copy of these Rules, which he will be required to carry out implicitly.

The Gatehouse will be considered the Headquarters of the Brigade, where all notices will be exhibited, and where, in the event of Fire, information as to the locality will be obtainable.

DUTIES OF CHIEF OFFICER.

RULE 1.—The duties of the Chief Officer, Mr..........will be to instruct the Brigade in their duties, to drill them, and take charge of all operations of the Brigade when called out for Drill. In the case of Fire he will take charge in the absence of Captain. If Captain is present he will take charge of nearest Hydrant.

He will see that all appliances and accoutrements are kept in order and in their place, and will report monthly to the Captain upon the condition and also upon the general efficiency of the Brigade.

He should also, in case of Fire, endeavour to be first on the spot, so that he may be able to consider the best means of extinguishing the Fire, and, above all, how to save the Firm's property.

DUTIES OF SECOND OFFICER.

RULE 2.—The duties of the Second Officer are to take the duties of the Chief Officer should he be absent. If Chief Officer is present he will take charge of second nearest Hydrant.

Fire Precautions.

DUTIES OF ENGINEER.

RULE 3.—The duties of the Engineer will be to keep all appliances in good repair, and see that the reserve feed water tanks are kept full at all times, and, in the event of Fire, to see that the water from town supply is turned off from the boilers, and that the reserve tank water is used. He will also provide himself with the necessary canvas, copper wire, and pliers to readily repair burst hose and otherwise act as directed.

DUTIES OF FIREMEN.

RULE 4.—The duties of Firemen are to carry out all orders given by the Senior Officer present immediately and without question. Each Fireman will be held responsible for his belt, axe, pouches, etc., being kept in their proper place and in good condition.

RULE 5.—Each Fireman must make himself acquainted with the exact position of Hydrants, Hose Boxes, Ladders, Lamps, etc., enumerated as follows:

1.......
2.......
3.......
4.......
5.......
6.......
7.......
8.......
9.......
10.......

Ladder in Department..........

Ladder in Gangway between Departments..........

Lamps at Headquarters.

RULE 6.—The ten Hydrants are apportioned for cleaning as follows:

.. 1 and 2.
.. 3 ,, 6.
.. 4 ,, 5.
.. 7 and 8.
.. 9 ,, 10.

..........will be responsible for cleaning Lamps and Ladders, and cleaning and drying Hose after use at any time.

Each man will be responsible for the good condition of Hydrants, Hose, and Branch under his care, and will see that free access to the Hydrant is possible at all times.

Each Hydrant and its appurtenances are to be cleaned once a week. Such cleaning may be done at any time so long as it does not interfere with the Fireman's regular work.

GENERAL.—Hose after use should be taken to Fireman..........., who will be responsible for drying and cleaning.

Ordinary Drills will be held once a month, notice of which will be posted at Headquarters, when all members must attend.

Turn-out and surprise Drills at the discretion of the Captain.

A Roll Book will be kept at Headquarters, in which the attendance of the Brigade at Drill will be recorded. On this record, together with marks of efficiency and care of the fire appliances, will depend the yearly grant of the Firm.

SIGNAL CODE.

"*Forward, Get to Work.*"—One Whistle, or Lamp waved from left to right over head.

"*Turn on Water.*"—Two sharp Whistles, or Lamp waved twice from left to right over head.

"*Halt! Turn off Water.*"—One long Whistle, or Lamp held for continued period over head.

"*Make Up.*"—Three Whistles, or Lamp brought down and raised again.

"*All available hands wanted.*"—Four Whistles.

Fire Call.—Continued Whistling.

FIRE DRILL. ALL HANDS.

The men will form up at Headquarters and be numbered off.

On the alarm being given, No. 1 section of three will run to nearest Hose Box to the Fire and proceed as at Drill No. 3.

No. 2 section will run to the next nearest Hose Box and proceed in like manner.

Firemen Nos. 7, 8, and 9 will fetch Ladders, Spare Hose, etc., as instructed.

Firemen No. 10 will convey Captain's orders, or act as instructed.

MAKE UP.—On the signal "Make Up," all hands will assist to make up and put away gear, afterwards falling in at Headquarters as they finish.

Although written in the form of a Drill, this is the proper course to be followed at a Fire, and for practice men will be told off without numbering, taking up their duties in the order they are told off.

GENERAL RULES TO BE FOLLOWED IN THE EVENT OF FIRE.

On receipt of information of a Fire, the Gatekeeper will at once ring electric bells, which will be heard at the boilers and the Steam Whistle will be blown continuously.

Should a Fireman discover a Fire, he should at once send the alarm to the Gatehouse by anyone near, and himself proceed to run out nearest Hose, etc., and further act according to circumstances. On the alarm being given after dark, the Gatekeeper should at once equip himself and proceed to Fire after instructing boy to light lamps and otherwise how to act.

During operations at a Fire, all Lamps should be kept as near the ground as possible.

On hearing the alarm, the Members of the Brigade will immediately make for Headquarters, equip themselves and make for the scene of the Fire, taking Ladders and spare Hose with them.

The first Fireman on the scene, if no Officer is present, will take charge until Officer arrives.

If it has been found necessary to call the Public Fire Brigade, the man in charge of Gatehouse will see that all carts are drawn away from gates, and look out for Firemen so as to direct them to the quickest way to reach Fire.

All shouting to be avoided, and messages, if possible, to be carried by Firemen.

No instructions whatever to be taken from anyone except Officers or Fireman in charge. THIS IS MOST IMPORTANT.

In the event of Fire at night, the Watchman will at once inform Gatekeeper, and then instantly equip himself and act according to circumstances.

The Gate-keeper will call the Public Fire Brigade by means of Alarm at........, and Firemen............................

It must be remembered that the Brigade would have to act much as a Salvage Corps, and immediately Fire is out or under control all available hands must at once get to work to save spoilage, by moving goods, mopping up water, wiping down machinery, etc., etc., under directions of Officers, who would utilise any servant of the Company in this work as seems best.

Members of the Brigade must at all times carry this Copy of the Rules on their person and produce same for inspection whenever called upon by the Officers to do so.

By order,

W. BLANK & CO., LTD.

It will be necessary for each fireman's card of rules to be endorsed

Fire Precautions.

in the following terms to ensure his admission to the scene of the fire should the local public brigade or police be already in attendance :

To the Chief Officers in Charge of the Police or Public Fire Brigade.

The holder of these Rules.................................is a trained Fireman in our private Brigade, and his knowledge of our Works will be useful.
Please, therefore, allow him to pass to our Works situate in Main Road, London.

For and on Behalf of

W. BLANK & CO.,

....................*Works Manager.*

An allowance of one shilling may be made to each fireman in respect to each drill or practice.

The firemen should live near the works or connected by electric alarm bells with the Gatehouse.

Attention to these matters will ensure hydrants and roofs being always accessible, and hose, chemical extincteurs, and other appliances in usable condition. The position of water and gas valves and cocks should be plainly marked by prominent metal plates.

Below is given a copy of the 1913 schedule of rebates allowed in respect to fire precautions by the leading Fire Offices :

SCALE OF ALLOWANCES.

For appliances for the extinction of fire *kept or situate on the Premises insured.*

	Percentage of Premium.
1. BRIGADE PORTABLE STEAM FIRE ENGINE, OR FLOATING STEAM FIRE ENGINE and a trained Fire Brigade to work the same - - - - - - - -	10
2. MANUAL FIRE ENGINE of modern construction, not less than 12 manual power, and a trained Fire Brigade to work the same - - - - - - - -	5
3. BOILER PUMPING ENGINE, OR STATIONARY FIRE ENGINE of efficient power, with Hydrants attached or in yard, and at least one Hydrant connected therewith on each landing of the staircase or on each floor, the Engine to be worked by power always available - - - - - - - - - - - - - - -	10
4. BOILER PUMPING ENGINE, OR STATIONARY FIRE ENGINE, as in No. 3, but without a Hydrant on each landing or each floor - - - - - - - - -	7½
N.B. 1.—Allowances under Nos. 3 and 4 are not to be treated as cumulative.	
N.B. 2.—Under Items 3 and 4, petrol or motor spirit Fire Engines may only be accepted if used in conjunction with Turbine Pumps and after full particulars have first been submitted for approval on forms provided for the purpose. The special regulations respecting petrol or motor spirit Engines contained in the forms must be complied with.	
5. TWO OR MORE FIRE PLUGS OR HYDRANTS in the yard and at least one Hydrant on each landing of the staircase, or on each floor, supplied with water from public waterworks, elevated reservoirs, or other independent source, with adequate constant supply - - - - - - - - - - -	7½
6. TWO OR MORE FIRE PLUGS OR HYDRANTS, as in No. 5, but without a Hydrant on each landing or each floor - - - - - - - - - - -	5
N.B. 1.—In the case of Risks having no Yard in which Fire Plugs or Hydrants can be fixed, at least one Hydrant on each landing of the Staircase or on each floor, or in the case of Sheds at least two Hydrants, may be regarded as equivalent to two or more Fire Plugs or Hydrants in a Yard.	
N.B. 2.—Allowances under Nos. 5 and 6 are not to be treated as cumulative.	
In all the above cases there must be a sufficient quantity of hose and water available at such a minimum pressure as to command the premises insured, and particularly in the case where an Allowance is made for a Hydrant on each landing or floor there must be an adequate supply of hose kept thereon. In the case of Appliances fitted up after the 29th June, 1893, there must be in the mains and hose a clear water-way of at least two inches in diameter.	
7. PORTABLE CHEMICAL EXTINCTEUR OR EXTINCTEURS having an aggregate water capacity of two imperial gallons for each 250 superficial yards or part thereof, but not less than four imperial gallons on each floor, the water capacity of an Extincteur to be not less than one imperial gallon or more than three imperial gallons - - - - - - - - - - - - - -	5

Fire Precautions.

Percentage of Premium.

8. **BUCKETS OR CANS** of not less than two imperial gallons capacity each, always filled with water, having three Buckets or Cans to each 250 superficial yards or part thereof, but not less than six on each floor - - - - - - - - 5

N.B.—In Dynamo Houses and rooms in which spirit * is stored or used in any manufacturing process the buckets or cans may, if desired, be filled with dry sand instead of water, or two approved dry-powder extinguishers, of not less than 100 cubic inches capacity each, may be allowed as equivalent to one bucket or can of water.

* By the term "Spirit" in this N.B. is meant any liquid product giving off an inflammable vapour under 73° Fahr.

9. **EFFICIENT PORTABLE FIRE PUMPS**, having not less than one to each 500 superficial yards and not less than one to each floor, with adequate water supply - - 5

N.B.—In order to qualify for the Allowance under Items 7, 8 and 9 and the N.B. 1 to Item 6, it is not necessary that each floor of a building should be equipped with the same description of appliance, that is to say, the requirements under those items may be regarded as alternative in respect of the various floors, provided, however, that in order to qualify for 10 per cent., there must be at least two distinct classes of appliance to scale on each floor.

Memo. No greater Discount or Allowance than 15 per cent. will be made for any combination of the above Appliances, nor more than 10 per cent. for any combination of the Appliances set forth in Items 7, 8 and 9, and the N.B. 1 to Item 6.

The revised requirements as to the capacity of Extincteurs, Buckets or Cans referred to in Items 7 and 8 need only be applied to such Extincteurs, Buckets or Cans as are provided after the 18th April, 1913. Extincteurs, Buckets or Cans provided prior to that date, need only comply with the requirements then in force.

The discounts for Automatic Sprinkler Installations vary, the stock and plant in some industries being more susceptible to water damage than in others.

The discounts also depend upon the standard of the installation, but in the case of single water supplies the allowances run from 7½ per cent. to 20 per cent., and, for installations having not less than two water supplies, the allowances range from 25 per cent. to 60 per cent., these being in addition to the allowances under the scale for ordinary appliances.

The fire insurance surveyor will generally give advice worth following as to precautionary methods. Quite usually he will stipulate for certain alterations, such as steel-clad doors in party walls.

Gate Control.

Gate control is essentially a matter of the gatekeeper's functions, but it is convenient to include under the term, watching duties, even though they involve patrolling the Works.

Reference has already been made to the desirability of gatekeepers and, therefore, also watchmen, who may have to take gate duty, being qualified to render first-aid, and further that the Ambulance Room should be part of the Gatehouse.

Recommendation is made to utilise the Gatehouse as the headquarters of the Works Fire Brigade, and the Gatekeeper will have very important duties in regard to raising the alarm if fire breaks out.

The very usual wooden shanty does not perhaps lend itself to these developments, though a well-built wooden hut can serve every purpose if it be spacious enough.

Local conditions must wholly determine the regulations necessary

Gate Control. at the Gatehouse, but various points will be suggested by the following outline of possible Gatehouse regulations :

General Instructions to Gatekeepers.

Day duty 6 a.m. to 6 p.m. every day, including Sundays.

Night duty 6 p.m. to 6 a.m. every day.

Duties to change every fortnight from Day to Night and *vice versa*. A relief man will take duty on alternate Sundays, thus allowing the man coming off day duty on Saturday evening to have a 24 hours' break before taking up night duty on Sunday night, and similarly the man coming off night duty on Sunday morning to have a 24 hours' break before taking day duty on Monday.

Eight days' holiday with pay will be allowed each year.

The Gate must be closed punctually at the proper starting times.

The coming and going of workmen is to be watched and no stranger must be allowed to enter the Works without proper authority, viz. a permit signed by the Works Manager or Secretary. No permit to be accepted on a Sunday. All permits after use to be initialed by Gatekeeper and sent to Works Manager.

All workmen entering or leaving the Works at irregular hours are to be noted in Gatekeeper's Register.

5-23. Overtime Tickets or Pass Out Tickets must be furnished by men leaving at irregular times,
5-24. and note made accordingly in the register.

In the case of workmen going to an Away Job, their departure is to be authorised by an Advice of Despatch stating time, destination, purpose and Order No. Pass Out Tickets are necessary in addition, and the Warehouse are to be advised in all cases where an Advice of Despatch is not shown to the Gatekeeper.

Material Passes will be necessary, in addition, for materials that are despatched or taken away through other than the ordinary channels.

All keys are to be received at night and hung in place on keyboard.

A report of any keys not delivered up is to be included in the Gatehouse Report Book of any irregularities or special occurrences coming under the notice of the Gatekeeper.

This book must be in the nature of a diary to be made up as the day or night proceeds, and duly signed on going off duty. If there is nothing to report entry must be made accordingly.

The book is to be submitted at 9 a.m. each day to the Works Manager.

All weighings on the Weighbridge are to be recorded by the device provided, and the stamped Weigh Cards are to be passed over to the General Stores.

The Gatehouse is to be kept clean and in first-class order.

Any notices posted in the Works must bear the Works Manager's approving signature, whatever their character.

Excessive smoke from the Works Chimney is to be observed and reported in the Gatehouse Report Book.

The Gatekeeper on duty will be responsible for calling the Works Fire Brigade in the event of any fire occurring and also the local public brigade.

When the General Office is closed, the Gatekeeper is to note down all telephone messages and pass them on by telephone to the General Manager.

On receipt of telegrams to telephone General Manager for instructions. (Telegrams must never be opened without very definite instructions from the General Manager.) In the General Manager's absence, telephone messages and telegrams to be sent by messenger to Mr................ house.

Special Instructions will be issued for Works Holidays which will apply only during the particular holidays.

Special Instructions to Day Gatekeeper.

To attend to all Time Recorders, setting the time by the Public Clock indicated on the Factory Abstract, and to see that they are always in working order for recording.

To put number and name on Workmen's Time Cards.
" " " Weekly Time Allocation Sheets.
" " Outside Staff Time Cards and Sheets.

To sort Pay Tins for each week into numerical order.

To note the attendance of Head Foremen and Officials.

On the engagement of workmen, to give out numbers, time cards, and assist the Wages Office Clerk as much as possible.

To keep the Factory Register as required by law, under the direction of the Wages Office.

Special Instructions to Night Gatekeeper.

To sort Workmen's Time Cards each night into numerical order.

To mark lost time on Workmen's Time Cards each week.

To visit the General Offices twice nightly—actually entering any office not provided with glazed doors.

Special Instructions to Outside Night Watchman.

To attend same hours and on same conditions as Gatekeepers.

To patrol the Works thoroughly, registering at the Clock Stations at least every hour.

To attend to Boiler Fires, watching the Steam and Water Gauges to see that all is going well.

In the event of Fire, immediate alarm is to be given to the Gatekeeper on duty.

The gas must be turned off at the principal meters each night, after workmen have left and after all gas lights other than Pilot Service lights in the Works have been turned off. The gas to be turned on at the meter again each week-day morning.

Make up fire in hardening muffle every night as required. Instructions as to when muffle is to be shut will be found chalked on the door of same.

Apprentices.

In the matter of apprenticeship, a responsibility attaches to the Management as to the training, control and encouragement of apprentices, that can only be met in a Works of any size by placing some officer in charge of the lads as Superintendent of Apprentices. The officer will usually have other duties to attend to, such as Inspection or Estimating, but he must be in close personal touch with each lad. The personal element of the Superintendent has a very large influence on the possible attainments of the apprentices and, given the right man, the expense of this guardianship will be more than justified.

There will often be a distinct gain in also appointing a Mechanical Instructor to assist apprentices in their practical work. This arrangement is particularly valuable when the Departmental Foremen's duties are too heavy to allow them to give the matter their personal attention.

Each apprentice's studies require to be looked after, and reports obtained of their attendance at evening or other technical classes and their progress.

The plan of allowing apprentices to attend day classes may be well enough for exceptionally gifted boys, but it is apt to be treated as merely a relief from work, unless the results of such attendance are both criticised and appreciated by the Management.

Sometimes apprentices attending evening classes are allowed to start work after breakfast the next morning—being paid as from 6 a.m. Here, again, the class attendance is very apt to be perfunctory, and a minimum interest taken in the class work.

The many facilities, available for the great majority of apprentices, for evening tuition are not altogether appreciated by those who are catered for, and the proper keenness is more likely to be induced by adequate interest on the part of the employer than by any other means. The employer can rarely take the requisite detail day-by-day interest through a Superintendent of Apprentices.

Sometimes advances in pay are based on the apprentice's success at examinations conducted by the Board of Education and City and Guilds Institute.

The following draft regulations for apprentices will be probably helpful in considering the subject.

REGULATIONS FOR TRADE APPRENTICES.

1. QUALIFICATIONS.

The age at the commencement of the trial period must not be less than 15 or more than 16½ years.

Applicants will be required to sit at an Entrance Exam. to be held at the beginning of March or September at the local Technical Institute, to test their general education. The subjects of examination will be English, Mathematics, Science and Drawing, to the extent covered by the preparatory course at that Institute.

Applicants must be of sound constitution and good bodily health and strength, and after passing the entrance examination will be subjected to medical examination by a Medical Officer instructed by the Company.

Apprentices.

2. Trial Period.

Selected applicants will be employed on trial in the Works for 600 hours, commencing either at the beginning of April or October.

The regulations and scale of pay for Indentured Apprentices will apply during the trial period, but pay will be suspended if behaviour is not satisfactory.

3. Indentures.

After the trial period, if the applicant has been industrious, has kept good time and gives promise of being a good workman, the Company will execute with him, in conjunction with his parent or guardian, an Apprenticeship Indenture covering the time of service.

A premium of 5s. is payable to the Company, with 2s. 6d. stamp duty, on the execution of the apprenticeship deed.

The Company reserves the right to suspend or discharge any apprentice for inefficiency, bad timekeeping or misconduct.

4. Duration of Apprenticeship.

The full term of apprenticeship to the trade of Machine Shop Mechanic, Patternmaker, Carpenter, Plater, or Blacksmith is 12,650 working hours. With good timekeeping this term can be completed in rather less than five years. The full term for Tinsmith or Moulder apprenticeship is 7,600 hours, which with good timekeeping can be completed in rather less than three years.

The usual Works Holidays as stated in the Works Regulations have been allowed for in fixing the number of hours to be worked.

5. Course.

The courses laid down for the various trades are stated in a separate schedule, which gives the normal period for each stage.

By "normal period" is meant the time required by any intelligent, industrious trade apprentice to acquire the standard of proficiency necessary to promotion to the next stage of work.

Apprentices showing persistent diligence and merit in their practical work and their studies will have the opportunity of entering the Ratefixing, Drawing, or other Office Department for the last stage of their apprenticeship—subject, of course, to the number of vacancies at the time. This privilege will carry with it exemption from attendance before breakfast, without loss of pay, so that still further attention may be given to evening classes and studies.

Apprentices that do not qualify for the above privilege will do such work in the last stage of their course as may be merited by their previous progress.

6. Instruction.

The Mechanical Instructor, acting under the direction of the Superintendent of Apprentices, devotes his whole time to assisting the apprentices to become proficient in each stage of the various shop courses.

Instruction in Workshop Drawing will be given by the Company, as may be found necessary and convenient.

If attendance on Instruction Classes be required during working hours, as will usually be the case for instruction given by the Company, the time will be regarded as time worked and be paid for accordingly.

7. Pay.

The rates of pay, per hour worked, are also stated in the separate schedule, and it is to be understood that advances in pay will be contingent not merely on the proper number of hours being worked, but also on the requisite proficiency being attained in the stage of work in hand.

Overtime will be paid for in accordance with the Works Regulations. No apprentice under the age of 18 will be required to work overtime, and only under very special circumstances will overtime be worked by any apprentice.

8. Conditions of Work.

Apprentices shall be subject to all Works Regulations, including the hours of work, in force in the Department where they may be employed, and they will work under the direction of the Foreman, who will report to the Superintendent of Apprentices as to their behaviour and progress.

9. Absence.

Apprentices desiring leave of absence must apply to their foreman, who will refer to the Superintendent of Apprentices before granting same. Applications should be in the form of a letter from the parent or guardian.

Absence with leave and absence that is covered by a medical certificate, will count as time worked, up to a maximum of 106 hours in any one year, exclusive of Works Holidays. Absence for which no medical certificate is produced, must be explained by a letter from the parent or guardian; and, if satisfactorily explained, will be counted as absence with leave.

In cases of prolonged illness, the question of counting any further part of the absence as time worked will depend on the record of the apprentice as regards progress and behaviour.

In all cases of illness the Company reserve the right to have their Medical Officer certify the fitness of the apprentice before he resumes work.

Absence without leave will have to be made up at the rate of two days for each day's absence.

10. Evening Study.

Stress is laid on the importance of each apprentice diligently pursuing an organised course of evening study, such as that laid down by the local Technical Institute. Variations from this course must be submitted to the Superintendent of Apprentices for approval.

Particulars of classes for which entry is intended to be made must be sent to the Superintendent of Apprentices during the last week in September.

11. Annual Works Examination.

An Annual Examination in theoretical subjects and drawing will be made on behalf of the Company and marks awarded. The scope of these examinations will follow the lines of the Engineering Courses arranged by the local Technical Institute. The date of examination will be about the end of May.

12. Records and Rewards.

A permanent record will be kept of the timekeeping, proficiency, industry, etc., of each apprentice. These, and examination results will be appraised annually by a system of marks.

According to these marks, but subject to a fair proportion of marks being obtained under each heading, annual prizes of £2 and £1 will be awarded in September of each year to the first and second respectively in each group of apprentices. The grouping will be for the apprentices joining in April and October of each year to be considered together, with due allowance for the difference in time served at practical work.

Apprentices.

The first five in each group will also be paid in full for all Works Holidays during the ensuing twelve months. Apprentices, winning this privilege, who complete their apprenticeship before having reaped the full advantage, will be paid the balance in a lump sum.

Apart from these special rewards, the records will be the basis of promotion during apprenticeship and of re-engagement by the Company on completion of apprenticeship.

13. CERTIFICATE OF PROFICIENCY.

Apprentices completing their term to the satisfaction of the Company will receive certificates setting forth the kind of work in which they have had experience and the proficiency attained. Particulars will be given of their record generally.

Apprentices leaving, with the consent of the Company, before the completion of their term may be given similar certificates.

14. CHANGE OF ADDRESS.

Each apprentice must inform the Superintendent of Apprentices of each change in his parent's or guardian's address and his own.

15. INTERVIEWS WITH PARENTS OR GUARDIANS.

The Company will be pleased for the Superintendent of Apprentices to interview the parents or guardians of apprentices if an appointment is made beforehand.

16. MODIFICATION OF APPRENTICESHIP REGULATIONS.

These regulations may be modified from time to time by the Company, but no variation for individual cases can be considered except in the case of a nomination by one of the Company's Directors. Any such individual variation, when agreed upon, will be noted on the apprenticeship indenture.

17. EMPLOYMENT ON COMPLETION OF APPRENTICESHIP.

It must be clearly understood that employment by the Company automatically ceases on completion of apprenticeship, but re-engagement may be made immediately after, or at some later period, according to the Company's requirements.

The Company will be glad to be kept informed of the whereabouts of former apprentices, and will give preference to such when vacancies occur.

Regulations for engineer apprentices or pupils taking a more comprehensive course of training could follow on somewhat similar lines, with the admission age raised to eighteen.

Even when learners are not indentured, some scheme of training, encouragement, and special supervision ought to be instituted.

Following the references above to technical education, the following extract from a letter addressed to *The Times* (18th Sept. 1913) by the Chairman of the London County Council (Mr. Cyril S. Cobb) and the Chairman of the L.C.C. Education Committee (Mr. John W. Gilbert) will serve to sum up the present attitude of the administrators of our largest community, and to indicate how much has to be done in this direction.

EVENING EDUCATION UNDER THE LONDON COUNTY COUNCIL.

Technical schools and evening continuation classes now form, as most people are aware, an important permanent part of the educational system of the country. Attendance on the part of the student is however, entirely voluntary, and is often very unsatisfactory. There are, approximately, 195,000 students of all ages attending the various kinds of evening schools in London, but of the 195,000 students who enrolled during the session 1910-11 no fewer than 40,000 made less than 14 hours' attendance at instruction in any one subject. Of the students enrolled, 49,000 are between the ages of 14 and 17. It is estimated, however, that there are some 210,000 young people in London between these ages who are not receiving education in the day time, so there are some 161,000 who are not continuing their education either in the day or eveinng.

In Germany, where a compulsory system of continuation schools for young people up to the age of 18 is almost universal, the attendance is greatly superior to that of evening students in the United Kingdom. In England, where the system of compulsion is not in force, to secure satisfactory results it is necessary for education authorities and employers to co-operate in making the voluntary system as effective as possible.

The need for education continued beyond the standard of the elementary school is steadily being pressed home on all persons interested in social and economic conditions. Modern specialization makes all-round training difficult in most, and impossible in many, occupations. Long hours and late work prevent students who are otherwise willing from attending classes to supplement the daily training in the workshop or in the commercial house.

. . . .

There are already numerous examples in London of employers helping and encouraging their assistants. The County Council requires its messengers and apprentices to attend classes. The Admiralty, the War Office, the Post Office, and the Patent Office require boy messengers to continue their education. Some firms reduce the working hours for junior employees so as to permit of their attending specific classes; certain engineering firms send their apprentices for one whole day a week to technical institutes; and a number of printing firms allow their apprentices to leave early on one day a week to attend special afternoon classes. There are

Apprentices. other notable examples, including firms which allow classes to be conducted by the Council within the firm's premises and afford help and co-operation in the work.

. . . . The Council is anxious to secure the assistance of London employers in calling the attention of their employees to the opportunities now offered to them for continuing their education. It is suggested that the encouragement might take the form of personal suggestion as to attendance at suitable classes, of relaxation of hours to allow of attendance, of payment of fees, or of consideration of educational attainments in questions of promotion.

The Council is prepared to provide special teachers for classes in factories, workshops, or offices where a sufficient number of students can be brought together; to advise firms as to suitable courses and centres of instruction for their employees; and also to furnish periodical reports on the work done.

Recognition may be given here to the important educational work of a highly practical nature, both in commerce and technics, by the Correspondence Schools. These courses have certain advantages over class tuition that must appeal to keen men who have passed the normal evening school age.

Section III b

Labour.

Employment of Workmen. Among the arrangements incidental to the employment of workmen, it will be convenient to deal first with the question of giving a reference number to each man, by which he may be identified wherever and whenever any record is made in connection with him. This number may well enough be known as his check number, whether a metal check system is in use or not.

A common method of numbering is to have one series of numbers for the whole Works, *i.e.* No. 1 and up, but to reserve certain blocks of consecutive numbers for the various departments. This gives a general sequence of numbers for wages and other purposes, and serves to connect a man with his department, providing the reservation of numbers for each department is sufficient in the first instance to meet expansions and developments.

An alternative method is to number separately for each department using the department letters to qualify each series, *e.g.* A 1 and up, B 1 and up. This assumes that the departments are symbolised by letters, which should be done on other grounds, as providing a standard abbreviation in all records pertaining to the respective departments.

The advantage in the latter method is that there is no limit to the numbers available, thus avoiding any occasion to make a general move of numbers, if one department grows unexpectedly.

It will be an advantage if the numbers allotted to each department are grouped as to men and juniors. By juniors is meant young persons under eighteen years of age, to whom special Factory Act provisions apply, principally as regards overtime and time between meals. Boys under sixteen have to be passed by the Certifying

Surgeon, and those under fourteen have, in addition, to furnish a School Leaving Certificate before they may start work. **Employment of Workmen.**

The sequence otherwise of the numbers in each department can be in order of date of engagement. The point is unimportant, but is logical in the preference it gives at paytime to the older hands.

In view of the production and tool records, that are admittedly necessary nowadays, it is really worth some consideration to adopt a scheme of numbering the men that will not necessitate their numbers being altered except at widely separated intervals.

In the case of apprentices, who change from department to department, and whose records would be confused by a consequent change of numbers, the difficulty is overcome by giving them registration numbers, outside the range of number likely to occur in any department. To this number is added the symbol of the department in which the apprentice is employed at the time. For example, Apprentice No. 500 would be known as A 500 while in Department A, as B 500 in Department B, and so on. This is in itself an advantage rather than a drawback.

When men are required there is, with the advent of Labour Exchanges, an alternative to advertisement in the daily press or reliance on applicants at the Works Gate.

According to the latest returns available, there are 430 Labour Exchanges in this country and 1066 Local Agencies—the latter dealing more particularly with the administration of Unemployment Insurance. Enamelled plates referring applicants to the local Labour Exchange are supplied on application for affixing at the Works entrance, when all labour is to be taken on through an Exchange.

Apart from these methods it is frequently desirable to have on file a list of applicants for work, and to this end an Employment Application Form should be filled up by all applicants, so as to ensure the information being sufficiently complete to help selection.

It is not unknown in this country for all prospective employees to be interviewed by the one officer, thus constituting a sort of employment bureau, but usually the selection is made in the first instance by the foreman. The Engagement Form, together with 5-16. the man's character, as obtained from his previous employers on a Workman's Character Form, is submitted to the Works Manager 5-17. for approval. Sometimes each engagement has also to be approved by the General Manager, but it is doubtful if this attempt at further control is sound in principle, as the Works Manager's responsibility in this matter ought to be final and results criticised, rather than the apparent merits of the individual men engaged, their rates of pay and the number engaged.

Employment of Workmen.

The General Manager will be concerned to know the number of employees engaged and number discharged each week, both men and juniors.

Character reports are confidential and should be dealt with personally by the Chief Wages Clerk.

In the event of a report not agreeing with the workman's statement, this must be looked into factfully until the truth is clear. So far as there may be any item of the report that reflects on the man's suitability, this may rarely justify refusal to employ him because under his new conditions he may do well. The management should soon learn if the man is really unsuitable for their requirements, and must act accordingly then.

It is desirable that the rate of wages proposed by the foreman for any new hand should be stated at the time of engagement, and not left open for the Wages Office to find out afterwards. Each foreman should have a list of the normal rates of pay authorised by the Management. The district rate, or the rate stipulated to be paid in the district by particular trade unions, will leave the foreman little choice in many cases, but in other cases there can be either a fixed normal rate for a particular class of work or perhaps a range of rates. A foreman should not be discouraged from fixing a trial rate, when he is able to, and should be allowed to advance it at quite an early date, if the man clearly shows he is worth more.

In the case of boys and youths, there is apt to be unreasonable variation in the commencing rate of pay without some definite scale is adopted. It seems only fair to pay according to age in the first instance and then to advance at intervals of six months according to merit, there being, however, a maximum scale of say one or two shillings a week according to age, above the normal rate.

The practice of advancing rates at intervals of six months instead of twelve months is to be commended for all junior workers, as being more directly encouraging and therefore better policy.

The following scale of rates for unskilled junior labour is of importance as indicating the recognition by a leading community of the economic advantages of higher rates than have usually obtained amongst unskilled workers.

AGREEMENT BETWEEN THE BIRMINGHAM AND DISTRICT ENGINEERING TRADES EMPLOYERS' ASSOCIATION AND THE WORKERS' UNION.

The following minimum day rates were agreed between the above parties on 17th October, 1913 :

"It was mutually agreed that the rates of wages be as follows :

Age.	Youths.	Girls.
14	7/-	6/-
15	9/-	6/6
16	11/-	7/-
17	13/-	8/-
18	15/-	9/-
19	17/-	10/-
20	19/-	11/-
21	—	12/-

subject—

(1) That the rates apply to unskilled operations only.

(2) That a suitable probationary period be allowed, of from 3 to 6 months, according to the nature of the operation and capacity of the operator, and that Section 8,* 'Provisions for Avoiding Disputes' of the agreement with the Engineering Trades Unions, dated 1st October, 1907, be adopted."

Employment of Workmen.

After a man has been engaged it may be assumed that he will be subject to advance in wages or transfer to other departments. To regularise these changes a Wages Advice Slip should be made out by the foreman and passed to the Works Manager for approval and issue to the Wages Office. 5-18.

There is the further stage of discharge or paying off when a Discharge Note will be required of the foreman, in each instance, stating reason for discharge, the man's ability as a workman and his general conduct. 5-20.

It will be necessary, that, before any man is paid off, he shall have returned to their proper stores any tools or drawings he may have borrowed. For this purpose some notice is necessary to the Tool Stores to see what tools, etc., are on loan, and when in due course these are returned the workman requires to be given a Tool Clearance Receipt, which he can hand in to the Wages Office when claiming his wages. 5-21.

The Tool Clearance Receipt can be arranged with a counterfoil for advising the Tool Stores of the impending discharge.

Deductions from pay, if duly notified as a standing regulation, may be made in respect to missing tools, tool checks and tool books, on the understanding that same will be refunded when the missing articles are produced.

It is desirable to establish a simple routine in connection with the suspension of men when work is slack. A Discharge Note may be used suitably endorsed, and the routine as to a Tool Clearance Receipt carried out as in the case of a final discharge.

Trade Union Agreements.

In regard to trade unions, the recognition of district rates of pay for the skilled trades is general, and this constitutes perhaps the most important basis of agreement between trade unions and federations of employers.

In 1907 an important agreement covering this point and various other matters was reached in the engineering trades, and the text of this agreement is given below.

The Federation on the one hand, and the Trade Unions on the other, being convinced that the interests of each will be best served, and the rights of each best maintained by a mutual agreement, hereby, with a view to avoid friction and stoppage of work, agree as follows:

1. *General Principles of Employment.*

The Federated Employers shall not interfere with the proper functions of the Trade Unions, and the Trade Unions shall not interfere with the employers in the management of their business.

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* See p. 88.

Trade Union Agreements.

2. *Employment of Workmen.*

Every employer may belong to the Federation, and every workman may belong to a Trade Union or not, as either of them may think fit.

Every employer may employ any man, and every workman may take employment with any employer, whether the workman or the employer belong or not to a Trade Union or to the Federation respectively.

The Trade Unions recommend all their members not to object to work with non-union workmen, and the Federation recommend all their members not to object to employ Union workmen, on the ground that they are members of a Trade Union.

No workman shall be required, as a condition of employment, to make a declaration as to whether he belongs to a Trade Union or not.

3. *Piecework.*

Employers and their workmen are entitled to work piecework, provided:

(*a*) The prices to be paid shall be fixed by mutual arrangement between the employer and the workman or workmen who perform the work.
(*b*) Each workman's day rate to be guaranteed irrespectively of his piecework earnings.
(*c*) Overtime and night shift allowances to be paid in addition to piecework prices, on the same conditions as already prevail in each workshop for time work. All balances and wages to be paid through the office.

4. *Overtime.*

The Federation and the Trade Unions are agreed that systematic overtime is to be deprecated as a method of production, and that when overtime is necessary the following is mutually recommended as a basis, viz.:

That no Union workmen shall be required to work more than 32 hours' overtime in any four weeks after full shop hours have been worked, allowance being made for time lost through sickness, absence with leave, or enforced idleness.

In the following cases overtime is not to be restricted:

Breakdown work, repairs, replacements or alterations for the employers or their customers.
Trial trips and repairs to ships.
Urgency and emergency.

5. *Rating of Skilled Workmen.*

Employers have the right to employ workmen at rates of wages mutually satisfactory to the employer and the workman, or workmen, concerned.

In fixing the rates of skilled workmen, the employer shall have regard to the rates prevailing in the district for fully trained and skilled men.

Unions, while disclaiming any right to interfere with the wages of workmen other than their own members, have the right in their collective capacity to arrange the rate of wages at which their members may accept work.

General alterations in the rates of wages in any district shall be negotiated between the Employers' Local Association and the local representatives of the Trade Union or Unions concerned.

6. *Apprentices.*

There shall be no recognised proportion of apprentices to journeymen, but it shall be open to the Unions to bring forward for discussion the proportion of apprentices generally employed in the whole federated area.

An apprentice shall be afforded facilities for acquiring a practical knowledge of the branch of trade he adopts and shall be encouraged to obtain a theoretical knowledge thereof as far as circumstances permit.

7. *Selection, Training, and Employment of Operatives and Manning of Machine Tools.*

Employers have the right to select, train, and employ those whom they consider best adapted to the various operations carried on in their workshops, and to pay them according to their ability as workmen.

Employers, in view of the necessity of obtaining the most economical production, whether by skilled or unskilled workmen, have full discretion to appoint the men they consider suitable to work all their machine tools, and to determine the conditions under which they shall be worked.

The Federation recommend their members that, when they are carrying out changes in their workshops which will result in displacement of labour, consideration should be given to the case of the workmen who may be displaced, with a view, if possible, of retaining their services on the work affected, or finding other employment for them.

8. *Provisions for Avoiding Disputes.*

With a view to avoid disputes, deputations of workmen shall be received by their employers by appointment, for mutual discussion of any question, in the settlement of which both parties are directly concerned; or, it shall be competent for an official of the Trade Union to approach the Local Secretary of the Employers' Association with regard to any such question; or, it shall be competent for either party to bring the question before a Local Conference to be held between the Local Association of Employers and the Local representatives of the Trade Unions.

In the event of either party desiring to raise any question, a Local Conference for this purpose may be arranged by application to the Secretary of the Employers' Association, or of the Trade Union concerned, as the case may be.

Local Conferences shall be held within twelve working days from the receipt of the application by the Secretary of the Employers' Association or of the Trade Union or Trade Unions concerned.

Failing settlement at a Local Conference of any question brought before it, it shall be competent for either party to refer the matter to the Executive Board of the Federation and the Central Authority of the Trade Union or Trade Unions concerned.

Trade Union Agreements.

Central Conferences shall be held at the earliest date which can be conveniently arranged by the Secretaries of the Federation and of the Trade Union or Trade Unions concerned.

There shall be no stoppage of work, either of a partial or of a general character, but work shall proceed under the current conditions until the procedure provided for above has been carried through.

9. *Constitution of Conferences.*

An organising delegate of the Amalgamated Society of Engineers shall be recognised as a Local Official entitled to take part in any Local Conference, but only in his own division. In case of sickness, his place shall be taken by a substitute appointed by the Executive Council.

Any member of the Executive Council, or the General Secretary of the Amalgamated Society of Engineers may attend Local Conferences, provided that the member of the Executive Council shall attend only such Conferences as are held within the division represented by him.

A member of the Executive Council, or the General Secretary of the Steam Engine Makers' Society and of the United Machine Workers' Association respectively, may attend any Local Conference in which the Societies, or either of them, are directly concerned.

Central Conferences shall be composed of members of the Executive Board of the Federation and members of the Central Authority of the Trade Union or Trade Unions concerned.

An Employer who refuses to employ Trade Unionists will not be eligible to sit in conferences.

The working of the premium system is covered by what is generally termed the "Carlisle" agreement reached in 1902 at Carlisle. This provides that time rates shall be paid for each job, or in other words, that daywork rates of pay are guaranteed whether a job is done within the time limit or not. Further, that overtime and nightshift allowances shall be paid under the same conditions as previously obtained for daywork, which means that only the bare time worked is counted against the time limit. The extra quarter time allowance, etc., for overtime is therefore paid in addition. The third point is that after a time limit has been found satisfactory, it shall only be changed if the methods of production are changed.

At the end of 1913, however, the Amalgamated Society of Engineers decided by ballot to give notice of their intention to terminate both agreements. This throws important matters of administration into the melting pot and the settlement has yet to be reached. Whatever the upshot, it is to be presumed that ratefixing as developed for the proper running of a premium system will continue to function in regard to estimating operating times, so that even the abandonment of the premium system in this country would not destroy the value of administrative work at present identified with that system. However, discussion of the results arising from abandonment of the system is premature at present.

In the engineering trades the question of bad faith on the part of trade unions in the keeping of agreements with employers' organisations hardly arises, but there is a tendency among some classes of workers to adopt tactics of a kind that promise to reduce collective bargaining to a farce, thereby denying one of the first principles of trades unionism.

The disputes now in progress (Jan. 1914) in the London building trades provide a clear illustration. The National Federation of Master Builders have found themselves called upon to pass the following resolution :

Trade Union Agreements.

> This federation considers that unless the executive committees of the unions can assure employers' associations with whom they enter into agreement that they are backed up by disciplinary power, and will use such power to secure their observation, it would be better to cancel all agreements.

They thus support the London Master Builders Association in the present lock-out affecting about 30,000 men. The London Masters have laid down as a condition of reinstatement of the men that each man must sign the following agreement before starting work again :

> I agree, if employed by you, to peacefully work with my fellow-employees (engaged either in your direct employment or in that of any sub-contractors), whether they are members of a trade society or not, and I agree that I will not quit your employment because any of my fellow-employees is or is not a member of any trade society ; and I also agree that if I commit any breach of this agreement I shall be subject to a fine of 20s., and I agree that the amount of such fine may be deducted from any wages which may be due to me.

A vital principle is at stake, and the men's leaders do not apparently dispute the right of the employers to demand good faith from the men. The Chairman of the men's executive is reported in the press to have made the following statement :

> "I contend that no individual member of the Masters' Association, and no individual member of our society, should be allowed to break any agreement that we have, and cause a stoppage of work such as this, involving thousands of men, at a moment's notice, without consultation with the officials, or going through the formula of going before the conciliation board, as had been agreed to."

The sectional strikes that occur so readily nowadays are often enough engineered without any regard to the undertakings of the men's leaders, and baffle employers as to how to achieve peaceful relations. The Syndicalists evidently desire that the employer should have no peace until he ceases to be an employer.

Leaving to one side syndicalism and sympathy strikes, the outstanding lesson to employers is that they will only maintain their position by "solidarity"—a term beloved by the labour leader. Employers are not all enthusiastic as to their common interests, and often fail to coordinate their strength adequately even when they associate themselves nominally. There is also a type of employer who virtually trades on the efforts of these employers who do organise and who do achieve some measure of success in collective bargaining with the trades union. For instance, but for these organisations district rates for the various trades might be much higher than they are, yet the outside or unaffiliated employer is able to command labour at these rates without having helped to settle them.

The Conciliation Boards that are in operation in various trades in various parts of the country, while obviously dependent on the men keeping faith, can, none the less, have small success except all employers in each trade combine effectively. The issue is one of community of interest and acceptance of a common standard of dealing—such a standard may conceivably be less generous than any one employer might adopt, but it will also be less grasping than other individual firms might adopt.

Trade Union Agreements.

The interests of the public generally and ultimately, therefore, of the members of the trade concerned, both employer and employed, will be best served by strong trade unions and strong employers' organisations.

Time-Keeping.

The long established method of checking men in and out of the Works by means of a system of metal checks, has given way largely to the more convenient method of mechanical time recorders.

The metal check method is being operated to-day in large works with every success; by virtue of its well rooted establishment, and the consequent selection of suitable men to look after the system.

The peculiar advantage of the mechanical time recorder is that by its use all disputes as to time are avoided. In the metal check system, however much supported by mechanical contrivances for closing the check boxes at appointed times, it is, if there is any dispute, only the word of the timekeeper against the workman (at least that is the workman's way of looking at it).

The avoidance of disputes by the use of mechanical time recorders only applies fully with the card type of machine, where the man sees for himself the time he has recorded.

In practice the use of a mechanical time recorder does much more than obviate disputes as to time, as by removal of the personal element a rigid adherence to the time of attendance can be insisted on without incessant warfare between the men and the timekeeper. In any case the record made is beyond all argument, providing the recorder is registering the correct local time, and in this connection, it is the soundest economy to have all recorders and indeed all clocks synchronised, so as to keep identical time.

In this connection the Post Office authorities afford certain facilities, as the following extract from the *Post Office Guide* will indicate.

TIME SIGNALS.

Where the telegraph arrangements permit, Greenwich mean time can be supplied by electric current every hour in the day in London, and at either 10 a.m. or 1 p.m. to places in the country.

Where sufficient support is forthcoming, special arrangements can be made for the hourly synchronisation of clocks.

The need for synchronising will appeal to wider circles, as works efficiency becomes more and more recognised as the taking care of minute details. The general discipline suffers when the time recorders differ in different departments. The factory bells and whistles should all be automatically synchronised with the time recorders.

A further advantage obtainable with time recorders is that they can be readily installed in any department—of course, metal check stations can be and are similarly installed in some works, but this

Time-Keeping. plan multiplies the need of men with the characteristics requisite for timekeepers, and cannot be said to put the check system on equal terms with the time recorder, in any direction.

Where recorders are installed in the various shops, or away from the gate, it is usual to allow one or two minutes, as may be necessary for a man who passes the gate on the stroke of the hour, to reach the recorder in time to register.

With regard to the supervision of the recorder itself, it must be remembered that it is only a recorder and, therefore, it is not a reasonable method of use to leave it regularly unattended when the workmen are using it. It is very easy to have someone stand by to open the recorder for use say ten to fifteen minutes beforehand, and then to lock it up one or two minutes, as may be the rule, after time. Alternatively the card racks, in the case of a card recorder, may be locked up to prevent their use without locking the recorder itself.

An allowance of ·3d. a day to a shop clerk may cover the early arrival in the mornings necessary for opening the card racks and the few minutes wait at night to close same. It is as well to lock up the recorder between times unless in use for job recording purposes.

The time card is essentially the record of attendance, as obtained by the use of a card type of recorder, and from which the time wages are calculated. The machine has to be set by the attendant, or is automatically set, for registering in the correct " IN " or " OUT " column, and automatically alters each day so as to bring the day spacings in the correct position—the change over from a.m. (upper line of each day) to p.m. (lower line) being adjustable to suit the working hours. Abnormal times such as late arrival and overtime can be indicated by a different colour stamping or by an asterisk, and it is certainly very helpful to have abnormal time distinguished in one or other of these ways.

A matter of some moment is the number of stampings that shall be required. In practically all cases the men stamp " IN " on every occasion of arrival, but in some, they only stamp " OUT " on leaving at night, unless working irregular meal hours, when they would stamp " OUT " for meals. In other cases, the stamping " OUT " at leaving off for the day is not required when leaving at the regular hour, but only when working overtime. The case occurs sometimes that stamping either " IN " or " OUT " for tea-time is omitted as robbing a short meal-time of a valuable minute or two. The settlement of what shall be done hinges on the gate control, but speaking generally, it will be well enough to waive the " OUT " stamping on going to meals, but to insist on the " IN " stamping

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after meals and the "OUT" stamping on leaving at night, whether at the regular time or not.

It is usual for the time cards to be held in racks beside the time recorders, one set of racks being provided on each side—one holding the cards ready for stamping and the other receiving the cards after stamping. Racks with the number labels at the side are more convenient, and allow the freer use of department symbols—a point that counts most when several departments use the one recorder, as would be the case in all but very large Works. Each recorder can handle up to 200 men—without unduly protracting the process of recording at a given time.

Some typical regulations affecting the question of timekeeping are given in Section III a.

Labour Records.

In dealing with questions relating to labour records, there is such diversity of practice that without a full knowledge of how each practice came into being one cannot hope to appreciate their individual merits, and still less is one helped by admitting them all as deserving of consideration.

There may be said to be only two serious problems in labour records, and that is to record when each man changes his job and what the new job is.

It is highly desirable to keep in mind, in considering this question, that the manner of making the labour records is a potent factor in setting up the atmosphere of proper discipline. The indirect results of striving after accurate labour records may, therefore, be as valuable as the direct results, and conversely the harm done in accepting approximate records is not by any means limited to inaccuracy in the cost accounts.

The phrase "striving after accurate labour records" is used advisedly because perfect accuracy may be said to be quite impossible of attainment as a working proposition.

On the other hand, it is not uncommon to fall unconsciously into accepting gross inaccuracies, although high ideals are intended, and the indirect effects on discipline may be worse than if lesser ideals had been followed. Speaking generally, the maintenance of a high level of accuracy in labour records is fraught with difficulties simply because human factors come into the question and human factors are notoriously shifting ones, that on different days give different results.

No experienced administrator would set out to devise any system wholly independent of the human factor, but he does ask for a system that shall indicate if the human factor has failed.

In coming to the detail of these problems it will be convenient

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to refer to the routine pertaining to labour records as "timebooking" in contradistinction to timekeeping which has reference rather to a man's attendance at the factory than to his work.

It will doubtless be obvious that "timebooking" in relation to the start of one job gives the essential information as to leaving off the previous job. There might, of course, be a gap between two jobs, but if this were serious enough to be given recognition, the timebooking would then apply to the idle period as if it were a job. Experience goes to show that idle time of this character never does get acknowledged by the shops. Any waiting incidental to a new job generally goes against that job, so that it may be said that timebooking is likely to be more accurate as to leaving off one job than as to starting the next. However, it will be found that the results will be the same, if it is considered that "timebooking" only necessitates stating the time of going "ON" the new job as first suggested.

Timebooking may be accomplished in various ways, of which the following are a fair summary :

Timebooking Method No. 1.

By the man booking daily on a chalk board or on a daily time sheet or card.

This is indeed a rough approximation, varying according to the temperament of each man. The sheet or card invites more time being spent by each man in filling up, but there is quite enough scope for wasting time with the rougher chalk board. The foreman's countersigning of these records can hardly ever be more than formal, and men have a way of seeing through formalities, so there is virtually no check on the men's statements. A man's idea of time spent on a job, if daywork, is a compromise between what it seemed like and what the job will "stand"—and as for his ideas if piecework or premium work is in question, no one thinks of accepting them.

Timebooking Method No. 2.

By the clerk taking down on a time sheet according to each man's verbal statement each day.

This scheme is better than No. 1 in proportion to the ability and tact of the clerk. Given the right man and few enough men to look after so as to allow not less than two visits to each a day, very fair results are obtainable, with the advantage of taking up very little of the men's time. Still the man's idea of the time of starting each job does come into this method and is not confirmed within close enough limits for the record to be used for piecework or premium payments.

Timebooking Method No. 3.

By the foreman (or charge hand) booking each man on a time sheet.

This arrangement looks as if it would make an excessive demand on the time of the foreman, but carried through in a proper spirit by a capable methodical man, who will school himself to making suitable notes immediately each man changes his job, the scheme has much in its favour. The record is independent of the workman and, given the right kind of foreman, should be quite satisfactory for computing piecework or premium work payments which means cutting out all other clerical work by the foreman on that score. Where a foreman is expected to formulate piece rates or time limits this scheme affords a great deal of the requisite day to day education. Obviously the whole value of the record hinges on the integrity of the foreman, who has the power of adjustment so readily to his hand, and can hardly be detected, if careless in his booking. Further, he cannot deal with many men properly or with jobs of very short duration.

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Timebooking Method No. 4.

By the man booking on a Job Ticket for each job by writing down the times "ON" and "OFF."

This pre-supposes a Job Ticket, presumably not made out by the man, which is a condition common to the majority of modern systems. If the man's booking is to be used for piecework or premium work payments then the foreman must confirm, which can only be satisfactorily done at the time. The trouble of getting the booking done at the time rather nullifies any advantage that can be credited to the scheme, in regard to relieving the foreman of any clerical work. It will be observed that this arrangement while providing for time booking on the different jobs does not provide the equivalent of the Time Sheet referred to under Methods Nos. 1, 2 and 3. The Time Sheet is essentially a weekly summary of each day's bookings or allocations for agreement with the wages paid.

Timebooking Method No. 5.

By the man stamping the times "ON" and "OFF" on a Job Ticket for each job by means of a Mechanical Time Recorder.

This goes far to meet the objection to Method No. 4, but it will not do to suppose that stampings will never be made so as to favour either the finished or the new job. Further, it is not impossible to do a job right out while remaining booked "ON" another one. This, however, is in the hands of the foreman to control. Success really hinges on the foreman, and he is stimulated to the best results by knowing that the means are there for the man to book accurately without his presence at the moment of a job being finished. The accuracy is at the expense of a journey to the Time Recorder by each man at each change of job and is not quite right for short jobs.

If racks are provided at the time recorder for Job Tickets, relating to the "Next Job" as well as the "Job in Hand," the foreman has the means of planning the work of his men ahead so that the man when stamping "OFF" the finished Job Ticket can stamp "ON" the new Job Ticket without referring to him on each occasion. The outstanding advantage of the use of the time recorder is that booking cannot be done after the event with any pretence to accuracy and the standard of promptness thus set up is very valuable in maintaining a general accuracy. Such records can accordingly be used for piecework or premium work payments with greater confidence. As with Method No. 4 this scheme does not furnish a Time Sheet.

Timebooking Method No. 6.

By the foreman (or charge hand) booking each man on each change of job by issuing a new Job Ticket.

This differs from No. 5 by reason of the men not stamping their Job Tickets on the Time Recorder. The foreman might book the time by writing or might use a Time Recorder. The advantage over Method No. 3 is in having a separate record for each job but there is the loss of the Time Sheet.

If a Time Recorder is in use rather difficult conditions are set up for the foreman to meet, seeing that the Time Recorder is necessarily a fixture. He is then apt to compromise between the shop difficulties and the office requirements with some sacrifice in accuracy. There is another aspect to be considered, namely, the finding of Job Tickets that have been already started on and interrupted. A Job Ticket rack (as referred to under Method No. 5) for "Interrupted Jobs" will, however, meet the case.

Booking on to the Job Ticket by the foreman means he must be at his desk a great deal if the booking is to be done at all promptly.

One adaptation of this principle is in extensive use in conjunction with the premium system of payment as follows:

> Each Job Ticket has a counterfoil or detachable coupon, and is made out by the charge hand, who fills in the starting time and hands the complete ticket to the workman.
>
> A Ratefixer in the course of his perambulations of the shops to which he is attached duly comes round to the man, puts on a Time Limit for the job and detaches the coupon on which he has noted his estimate. These coupons are passed in to the Ratefixing Office to be matched up in due course with the completed Job Ticket, thus ensuring that every Job Ticket and therefore all data of performances reaches that office ultimately. The Ratefixer's observation should check the general accuracy of the starting time booked on the ticket.
>
> The Job Ticket is suitably printed on the back for the workman to enter up daily his time on the job. This method is obviously more suitable where jobs are of long duration. A shop clerk, under the direction of the Wages Office, also calls on the man to note from his Job Ticket the time worked. These entries are made on a Weekly Time Allocation Sheet, and it is from these sheets the cost accounts are made up.
>
> Drillers and men on jobs of short duration have a weekly card serving as a composite Job Ticket. The Ratefixer fixes the Time Limit for each job in just the same way.
>
> In the case of labourers they fill in weekly cards approximating the time spent on different jobs.

Timebooking Method No. 7.

By the foreman making out a Job Advice Slip at each change of job, giving the necessary particulars to the Wages Office, and so to the Works Accounts Office.

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The advantages in this method over No. 6 are that the foreman can write the Job Advice Slips out anywhere in the shop, though in practice he may come back to his desk to do most of them, and what is rather important he is relieved of the necessity of finding Job Tickets relating to squad work and interrupted jobs. Incidentally while a Job Advice Slip must convey to the Wages Office, or maybe the Ratefixing Department, all the particulars necessary for filling out a Job Ticket, it has the appearance of being, and so far is, less work to make out a roughly written slip than a ticket suitable for office use and filing for reference.

Advice slips might be passed in skeleton form to a shop clerk to complete if the essential point as to time of starting be filled in by the foreman.

Timebooking Method No. 8.

5·25. By the workman filling in Job Advice Slips, for each change of job, to be countersigned by the foreman.

This method has its advantages in that it entails very little writing on the part of the workman, involves him in no calculations and proportionately relieves the foreman.

By suitably organising the collection and approval by foremen of these advice slips, the wages and cost records can be kept very closely up to time.

The foreman (or chargehand) will pass in the slips, through the medium of regular messenger service from the Wages Office, where Job Tickets are made out, and passed to Ratefixer if time limit or piece rate is required. Alternatively, the Ratefixer could have the advice slips first, and his assistant could make out the Job Ticket, passing same on to the Wages Office with the rate marked.

The Job Advice Slips can be supplied in pads to the men and when entry is made as to starting a new job an entry is made on the next slip at the same time, and before parting with the first slip, in readiness for indicating the completion of that job and the starting of another. Thus the advice slips are linked together by the man's own writing.

At the end of the pay week, say Wednesday night, a carry-over advice slip is made out, not so much for closing the one week's records as for opening the succeeding week's without disturbance of the previous week's slips.

Conceivably these Job Advice Slips could be arranged so as to be stamped as to time by a suitable mechanical time recorder. This would tend to much greater accuracy as to starting times, and the slips could be dropped in a box near by the time recorder, thus greatly facilitating their collection at frequent intervals.

Timebooking Method No. 9.

By a clerk booking on to Job Tickets from actual observation in lieu of the foreman or charge hand.

This is a scheme that can meet all requirements of accuracy and relieve both foremen and workmen of clerical work, and having only one distinct disadvantage, viz. the expense, unless on strictly repetition work where a large number of men can be dealt with. This condition, however, not merely reduces the cost but the same clerk can report day by day any falling off in the quantity of work done by each man, and this might be his most important function.

Under these conditions the clerk becomes a worktaker and the value of taking up particulars of time worked from this view-point is very far reaching.

Leaving on one side the particular method adopted of "Timebooking" it is necessary to consider further the matter of the Job Ticket and Weekly Time Allocation Sheet.

5·26. The Job Ticket is essentially the record of the time spent on a given job. In many ways it is a distinct advantage to have the whole record on one ticket.

When a mechanical time recorder is used, it is more usual, if not universal, to have separate job tickets for each week's time. This arises firstly, from the limitations of the time recorder, and secondly, it is possible by having tickets in each week representing the whole of that week's time, neither more nor less, to utilise the week's group of cards for cost allocation purposes—dispersing them afterwards for job data purposes.

It will follow from this that a job worked on in more than one pay week will involve a corresponding number of job tickets, which splits the record and burdens the file of records, unless each performance is abstracted. Obviously too, for every job in hand at the close of one pay week a continuation card must be written out for the succeeding week—quite a troublesome matter because falling due at the one moment throughout the Works, although possibly anticipated in part.

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Sometimes instead of a job ticket for each operation, a work tag for all the operations on one batch of parts is used—the work tag following the work through the shop.

If jobs were never hung up in the shops, and if batches, once started, were never broken, this scheme could be used more extensively than it is.

For making, say, a jig in the Tool Room, this method of obtaining the cost of each jig is likely to be admirable, as job tickets for every operation would hardly be feasible.

There is another variety of ticket necessitated by the short duration of such operations as drilling, and this is merely a composite job ticket for the day's work. If suitably printed, such a ticket could afterwards be cut into strips for each job entered, thus forming separate job tickets.

There is little doubt that no method of abstracting labour costs from summaries, be they daily or weekly, for job data purposes, can compare in usefulness, or even in accuracy, with having the initial record in unit form, that is, a job ticket for each job.

The purpose of a job ticket ought primarily to be the achievement of efficiency in production by providing comparable data of performances. Its secondary purpose is usually to furnish cost data for works accounts purposes. These two purposes might be argued as identical, and the distinction lies wholly in the administrative use made of the data.

The administrative use of job data may be assumed to lie in the Ratefixing Department, while the accounting use of the same data may be taken to lie in the Works Accounts Office. It may be further assumed that the function of the Wages Office is to collect the data or at any rate to complete it in accordance with the wages paid.

These three offices are named as typifying the essential phases of this matter, and it should be helpful in approaching the problem if these different aspects are properly understood and appreciated.

The first concern of the Wages Office is to make sure that the whole of each week's time is accounted for by the different job tickets, while the Ratefixing Office is concerned to know that the records of time on the job tickets are exhaustive and comprise the whole of the time worked on the job, irrespective of the week. The interests of the Works Accounts Office are to allocate or

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charge out to the proper cost allocation accounts the whole of the wages paid.

The different interests are best served when the job tickets can be released to the Ratefixing Department all complete, after the
5·28. Wages Office have built up a Weekly Time Allocation Sheet, which accounts for the whole time under consideration. These weekly time allocation sheets having served the Wages Office more particularly as to the time booked, are passed to the Works Accounts Office for allocating the Wages paid.

It is very doubtful economy to do without this weekly allocation sheet by building up cost figures from the job tickets themselves; mainly, because the completed job tickets ought to pass without delay to the Ratefixing Department, and not be held permanently in the Works Accounts Office. There will not always be a Ratefixing Department to function in this way, but the principle remains true.

Job tickets have a further highly important use in serving to operate a piecework or premium system. There is apt to be an idea that job tickets are only necessary where there is some system of extra pay in vogue, but while they are practically inevitable in that case, the general necessity and advantage holds equally good for day work or " datal " work as it is called in Sheffield.

The unit system of costkeeping of which the job ticket is the essential basis, is invaluable for estimating purposes.

Job tickets can be utilised, and usually are used, when inspection or viewing between operations is carried out, as viewing certificates ensuring firstly as to the correctness of the work, and secondly as to the remuneration due.

In some shops it has been found to be an advantage for the viewing certificate to be separate from the job ticket. In one case the object is to give the workman a receipt for his work, that he can produce if he does not agree to his pay, and in another case the object is for a carbon copy of the certificate, dealing with the complete operation, to also be made to serve as an instruction as to what is the next operation. This is an important step towards organising the movement of work about the shops, and is dealt with again under Production Efficiency, Section III e.

A point may be made as to printing a list of operations on the job ticket. This is a dubious practice as tending to slur the operations as to detail and to arrive at an indication only of the process. " Turning," for example, is really a process, and needs amplification such as " Rough turning flange " to indicate a specific operation.

From a costing point of view, the subdivision of costs under processes may be entirely satisfactory, but the same cannot be said if such records are to constitute job data for ratefixing purposes.

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It will usually tend to clearer definition of the operation if no printed list is offered on the job tickets, except in such cases as moulding, coremaking, forging, etc., where no amplification can be very well hoped for.

The weekly time allocation sheet can be developed to analyse the departmental expenditure on the various classes of orders—a matter of importance under some conditions. Such developments can, however, hardly be carried out with any economy and rapidity, except in conjunction with mechanical methods of listing and totalling. 5-30.

Extra Pay.

The question of extra pay as an inducement to extra output is a large one and an old one. Space forbids any examination of the various stages of development and experiments in this direction, but, by way of reminder of the serious attention that is being given to unifying the interests of employer and employed, a note is given below of a proposed bill dealing with profit sharing.

In order to encourage the principle of co-partnership the Companies Act (Amendment) Bill has been introduced into the House of Commons by Lord Robert Cecil and other Conservative members. The Bill is to enable companies to adopt co-partnership in cases where they would otherwise be debarred from doing so, either by their private Act of Parliament or their Articles of Association. In a schedule a model scheme of co-partnership is set out, and the Bill provides that such scheme shall be a condition precedent to granting statutory power to new companies to raise capital. Under the scheme certificates of partnership are to be granted to all in the regular employ of the company. The standard rate of wages is to correspond with a return of 5 per cent. on the capital, and when the return exceeds 5 per cent. the employee becomes entitled to a bonus calculated at one-twentieth of his existing wages for every 1 per cent. paid in dividend. A company with a capital of £100,000 and a normal wages bill of £20,000, if it paid 6 per cent., would necessitate an additional £1000 being paid to the men, if it paid 10 per cent: an additional £5000. A workman would then get 31s. if 5 per cent. were paid, but 37s. 6d. if 10 per cent. were paid as dividend. The whole of the bonus is not to be paid over, for one half is to be invested in shares of the company in the names of trustees. The Board of Trade may permit variations of the scheme, and also allow a smaller rate of bonus when salaries and wages bear an unusually high proportion of the cost of carrying on the company's business.

There are isolated schemes in existence, some pre-eminently successful. The Sixteenth Abstract of Labour Statistics of the United Kingdom, issued in October, 1913, gives the following figures:

Trade.	Number of firms practising Profit Sharing System at June 30, 1913.	Number of Employees.	
		Permanent.	Casual.
Metal	1	166	10
Engineering and Shipbuilding	5	19,651	100
Other trades	135	86,280	5,325

For the present purpose it will be sufficient to recognise only the two systems most extensively used, viz. piecework and premium system or premium bonus system, as it is sometimes called.

Now that day rates are guaranteed by the Engineering Employers' Federation, equally under piecework and premium system, the two can be fairly compared.

With piecework, a piece price is fixed on the basis that the whole of the savings or balance between the worker's day wages

Extra Pay. for the time worked and the price allowed, shall be paid to the worker.

With the premium system, the basis of the contract between the employer and employed is in terms of time, instead of money, and provides that of the gross savings a proportion only passes to the man. It is a point of importance that under a time limit system the influence of small differences in the hourly rates of the workers on the same job may be ignored.

It by no means follows that the worker is worse off under the time basis by the savings being divided. The time basis or time limit is not the equivalent in time of a piece price.

There are two widely recognised methods of apportioning these savings or gains, viz. the Rowan and the Halsey or Weir plan.

The Rowan plan evolved by Mr. David Rowan, and announced before the Institution of Mechanical Engineers in September, 1901, apportions the man's share by the formula of paying the same percentage on the wages for the time worked as is saved on the time limit.

Thus if Time Limit is 80 hours and Time Taken 60 hours, then percentage of time saved is 25 per cent., consequently workman will get a premium of 25 per cent. on his time wages, or 75 hours pay in all.

With the Halsey or Weir plan the apportionment is by simple division of the time saved, usually one-half being paid to the man.

Thus if Time Limit is 100 hours and Time Taken is 75 hours, then workman will receive a premium of one-half the time saved. *i.e.* 25÷2 or 12½ hours' pay in addition to the 75 hours' pay—a matter of 87½ hours' pay in all.

Mr. F. A. Halsey and Messrs. J. & G. Weir, Ltd., appear to have adopted this method of apportionment independently, and Mr. Halsey seems to have anticipated both Messrs. Rowan & Weir in the general principle of the premium system.

Perhaps the principal advantage claimed for the piecework system was that the wages cost of a job could never be exceeded, the worker bearing the loss if he could not make his ordinary time wage. That advantage no longer exists, when day rates are guaranteed, and where each job must stand alone, that is, where the losses will not be set against the gains.

The fetish of a fixed wages cost arises from a narrow conception of production costs and lack of knowledge of the shop charges per hour, as distinct from a percentage on wages. With shop charges properly appreciated as a substantial charge per hour, possibly exceeding the wages rate, the importance of a large output per hour becomes recognised as the leading factor in economical production.

A fixed wages cost per piece tends to prevent due attention being given to the length of time taken.

Under the premium system the importance of time saving is inevitably kept in view.

Extra Pay

Again, under piecework with the saving all going to the man, the increase in shop facilities and improvements in administration, such as material supply and tool service, is in the nature of a free gift to the man. This is not wholly so, because if the output is the greater thereby, there will be some saving to the employer in shop charges, whether recognised or not, although the wages cost remains constant. So far as these improvements make for reduction of cost there is no objection to the workman benefiting to an extent, in fact the aim of modern methods of management is to unify the interests of employer and employee in regard to increased efficiency.

When for some reason or other, probably in part by personal expertness, the pieceworker is enabled to make large earnings on some established piece rate the Management are unable to derive any advantage, such as reducing their selling prices and obtaining more orders, from these conditions except they cut the piece rates.

There is no doubt that piecework has got into bad odour by the unreasonable cutting down of rates, without the justification that might lie in an alteration of method of working.

The danger of cutting piece rates is warded off by the men, as far as possible, by taking care to seldom earn more than, say, time and a quarter.

This spirit of " ca' canny " or holding back may be checked by having the courage to let piece rates stand whatever the men's earnings. It may sometimes be very hard in consequence for a Works Manager to hold out against criticism of the old school where the incidence of shop charges is held to be a question of judgment rather than fact, and particularly so if the shop charges are expressed as a percentage of wages. This last matter is accentuated when the wages basis for applying the shop charges is taken as the whole price paid for the job, whereas it ought to be the wages for the time taken on the job, with the piecework balance or extra pay as additional wages costs not carrying shop charges.

A very much truer conception of production economy is obtained by applying shop charges on the basis of time worked.

Sometimes piecework is held to be conducive to scamped work and the temptation is certainly great, more especially if losses are deducted from gains—the usual piecework practice.

Bad workmanship is not, however, unknown under day work even when there is no stimulus to greater exertion, and inspection or viewing is a necessity under every system of remuneration if a uniformly high standard of workmanship is to be maintained.

Coming to further consideration of the premium plan, the out-

Extra Pay.

standing feature is that the gains of increased production are automatically shared, as to the wages cost, between employer and employed. Following from that condition there is the less need for reducing the time limits however favourable these may prove to be to the workers.

The Rowan percentage plan aimed particularly to remove the temptation to cut down the time limit because to do so, in any degree, is to undermine and destroy the requisite good feeling amongst employees towards the Management. This result is achieved by reason of the premium being the same percentage as the time saved. Obviously the maximum percentage is something short of 100 per cent., and as a consequence under this system double time could never be reached. Double time, of course, means a premium of 100 per cent. of the time wage.

From the employer's point of view the Rowan system may be said to have an advantage in that the rewards grow relatively less as the saving becomes more abnormal, and consequently that there is no undue incentive to scamp work.

A considerable number of men prefer the Rowan plan as favouring stability of time limits.

There is nothing in the objection to the Rowan plan that the men find it difficult to understand. Experience shows the reverse. On the other hand, the Halsey-Weir plan is admittedly a simpler formula, viz. one half of the time saved to go to the man.

Under either systems the conditions under which the time limits are fixed should make it no great difficulty for the Management to abide loyally by every time fixed, and at the same time to pay out willingly just as much as the men can be induced to earn.

Although calculation for fellowship, as it is known for piecework, that is for squad work and associated work, such as day shift man and night shift man, are facilitated by the Rowan plan, as also are comparisons between different performances, the Halsey-Weir plan has probably the most extensive use, and is likely to be preferred in future. The main ground of preference is the simpler expression of formula, and to some extent in having all extra pay earnings calculated first in hours saved, thus giving readily period totals of time saved. The average percentage of saving is the more readily obtained data in the case of the Rowan plan.

The best form of weekly statistics of savings under the Halsey-Weir plan is to take out the total of hours saved on each week's finished jobs and compute what percentage this is of the total of the time limits for these same jobs. This method eliminates the undue influence of high percentages on short jobs as may result from averaging the percentages saved on each job under the Rowan plan.

Extra Pay.

It is very desirable to keep a few general statistics of this character, especially when the run of work is not too frequently changing. Mechanical means of addition are, however, almost imperative if the extraction of such figures is not to be too troublesome and expensive.

"Fellowship" under the Halsey-Weir plan will be dealt with by expressing the time of each man on the job as a percentage of the whole time taken and applying these percentages to the distribution of the total premium.

Certain regulations of general application to piecework and premium systems have been indicated in Section III a.

The point made there as to time spent on defective work being treated as day work, will involve the Ratefixer notifying the Wages Office as to the appropriate deduction to be made from the time worked on this account.

Where the conditions allow it, and the requirements compel the completion of the original batch, the practice is recommended of not paying on any job ticket until the original batch is completed, thus involving replacement of defective pieces. This automatically ensures proper attention to completing replacements and has a most valuable influence on the regulation of the work-in-progress.

There may be also occasion for adjustments to be conceded on the ground of unforeseen tooling difficulties and the like.

Where juniors, or apprentices, are associated with mechanics, it is necessary for arriving at an equitable distribution of premium, and for maintaining the time limits on a more reliable basis (that is as if adults were employed throughout) to adjust the time taken by juniors by only counting part of their time in computing the time saved.

An illustration of such a regulation has been given elsewhere, viz. that for juniors earning 2d. or less per hour, one-half the time worked will be counted, and for juniors earning over 2d. but less than 4d. per hour, three-quarters of the time will be counted.

Some problems will arise when a man works more than one machine, for it is necessary some extra premium should be obtainable by a man working two machines, as compared with when working only one. On the other hand, it is hardly reasonable that he should earn the premium of two men working independently, for obviously it will only be certain selected jobs that can be run together in this way by one man. A fair compromise is to allow two-thirds of the single machine time limit for each of two machines worked by one man, while only half the single machine basis time may be allowed for each of three or more machines worked by one man.

In the case of a battery of automatics under one operator, such

Extra Pay. a rule would not apply and the basis of extra pay needs to be specially arranged to suit the circumstances of each case. Piecework is probably the best method here, as operation times can be verified to a nicety.

Ratefixing and its possibilities constitutes a subject in itself, and is therefore treated separately in Section III e.

A scheme for stimulating workmen to ignore the restriction of following previous performances—frequently a very real retarding influence on increased efficiency—and to let themselves go is to offer a special bonus to the workman in each department or possibly in each trade achieving the highest results for any quarter. The bonus being an extra halfpenny or penny an hour for the ensuing three months. Care is necessary in making the awards lest some of the men should be unduly favoured by the nature of the jobs falling to their lot.

In computing extra pay it is a distinct advantage for payment to be made the week following completion of job. This enables the viewing to be carried out more efficiently, and allows a much better arrangement of the Wages Office work, the staff being able to concentrate on the extra pay work for the first half of the week and on the ordinary wages the latter part of the week.

Some notification is desirable, and due to the men as to the jobs paid on each week, and the amount of extra pay earned on each. This requirement can be met and the wages routine generally
5·29. facilitated by the use of Extra Pay Slips for attachment to the weekly pay card. A carbon copy of the entries on the slips will serve as the official summary from which the Wages Sheets are made up.

Wages. Speaking broadly, wages are made up of time wages and extra pay. Time wages are the wages virtually earned by attendance, it being a separate issue for the employer to get value for the wages so paid. A system of extra pay, whether piecework or premium, may be said to ensure that adequate value is given though the broader principle of mutual interest should be the motive behind the administration of these systems.

Timekeeping, as already discussed, is necessary for computing time wages and "timebooking" for computing extra pay, although the time spent has to be considered in conjunction with the work done.
5·31. It may be assumed that the Wages Sheets will be made up from
5·22. the Time Cards as to the total hours at work and overtime allowances due, and that the totals of the extra pay earned will be derived from
5·29. the Extra Pay Book, containing the carbon copy of the Extra Pay Slips as issued to the men.

There may be questions of special allowances in some industries, *e.g.* for boiler trials, and these may be recorded in a separate Extra Pay Book marked " Special Allowances." **Wages.**

Deductions of a regular character such as National Insurance and Hospital Contributions can be dealt with entirely on the Wages Sheets, except as to a reference list stating the regular amounts and this may be arranged for on the Workman's Rate Sheets. 5-19.

Deductions of the nature of fines will require to be recorded in a Fines Book for reference and to meet Factory Act requirements.

The completed time card when issued on pay day as a Pay Card, may conveniently be made to serve as a notification in writing to the man concerned as to any fines incurred. The Works Manager may be well advised to initial all such entries as to fines or some other officer should do so to ensure the requisite care being used in the matter.

It is suggested that the Time Card shall only be completed as to total hours so as not to disclose rates of pay when the cards are issued for pay purposes.

The Extra Pay Slips can be perforated and the counterfoil strip stapled on to the cards, thus allowing the men to detach them for their own reference.

In the making up of the Wages Sheets, the preparation of the sheets as to names and rates may be undertaken early in the week by copying from the preceding week's sheets. This is one of the advantages to be derived from having loose sheets that may be bound up after preparation, though possibly not until completed and checked.

The difficulty of including new men is got over by placing their names at the end of the list on the first occasion and paying in that order. The names will take up their proper sequence according to check numbers in the following week.

5-20. As regards men leaving during the week their wages should be made up on a separate sheet and similarly with any men paid before the usual time. Their wages should not appear in the ordinary list, which is thus confined to those men who have to be paid at the regular time. It may be assumed that their check numbers will appear in the ordinary list, but without any amounts against them.

The machines on the market for addressing envelopes and listing generally can be adopted for Wages Sheets—the stencil method being perhaps more convenient and cheaper than rubber type.

Departmental totals and inclusive Works totals of wages are obtained by summarising the total of the respective Wages Sheets

Wages. on the last sheet of the department, and the departmental totals 5-32 on to a Wages Abstract. The advantage of this course is to restrict any alteration found necessary to the single sheet totals concerned and to facilitate arriving at section totals for pay purposes—a point of moment in agreeing the make up of coins by short stages.

It is imperative that the Wages Sheets shall be very carefully checked, and to this end it is not uncommon for the Time Cards to be separately extended and then called back with the Wages Sheet. Alternatively, it is feasible to do this extension on Pay 5-33. Slips. To do this will mean noting the rate per hour on the Pay Slip, and in view of the extra pay items to be added to the time wages and the National Insurance and other deductions made from the total, it will be better generally to concentrate all the checking on the Wages Sheets. The fact that removable sheets are in question allows the checking to be proceeded with by several men simultaneously, if necessary.

Pay Slips giving the net wages due are of much assistance in making up the pay.

These pay tickets can be arranged in sheets corresponding in quantity to the number of entries on each Wages Sheet, and should be of a suitable size for placing in the pay tins.

If a pay envelope is used instead of a tin, then the envelope will constitute the pay ticket.

At the end of the Wages Sheets for each pay section, a rubber stamp endorsement on the following lines should be made and the requisite certifying signatures given :

Wages Sheets Made up.	Wages Sheets Checked.	Insurance Cards to date.		Wages Paid out by
		Stamped.	Verified.	

The necessity for verification of the insurance stamping each week has become increased by the health cards being for six months. In any case, the values at stake demand every safeguard against misappropriation, and the requirements of the Act can only be met by the utmost care.

The coin analysis should correspond with the pay sections, so that each section can be agreed in making up the money before proceeding to the next section. Obviously errors will then be more quickly found than waiting till every man's pay is made up before finding the money work out wrongly.

The coin analysis may be carried to the extent of sovereigns, half-sovereigns, half-crowns, threepenny pieces, copper and sundry silver. The analysis of coin required is quite simple and the actual sorting of the silver from the bank may be done automatically by a silver sorter. The use of a silver sorter necessitates drawing the silver in guaranteed bags of say £50 from the bank, but this is not a prohibitive condition. The difficulty with unguaranteed £5 bags is that the particular bag in which an error occurs must be returned to the bank with a claim and to automatically sort silver in £5 lots for this purpose is too troublesome in respect to taking out the sorted coins. **Wages.**

The pay for two pay stations may be advantageously made up at the one table, and to this end two pay clerks will work together.

The coins for a given pay section being placed on the pay board the corresponding pay slips will be placed in a row on edge like coins. Pay Clerk No. 1 will select the coin and slide the amount to Pay Clerk No. 2, who will check and put in a pay tin with the pay slip on top to identify and, in a way, seal it. This routine obviates the risk of figures being read against the wrong check number, the usual source of the half-sovereign trouble, and makes for rapidity. Pay Clerk No. 2 by his checking accepts responsibility for these pay tins, and puts them in trays for locking up until pay time, when the pay boxes will be carried to the pay stations—the responsible pay clerk being in attendance during the transfer.

The pay clerks will change duties in making up when the pay for one station has been got ready.

It will be noticed that this arrangement obviates the sorting of the pay tins into numerical order beforehand. The shop clerk appointed to be on duty outside each pay station will need to look to empty pay tins being duly deposited in a suitable basket—one with a canvas funnel top will prevent damage by their being thrown with force into the basket.

Any competent clerk who has no responsibility for computing the wages figures may serve as a pay clerk. A small bonus of, say, sixpence for each pay correctly made up against which mistakes can be set will give an interest and efficiency to what is an extra responsibility. In offering the above outline of pay routine it is
assumed that away time will be made up separately from the ordinary 5-36.
wages as a petty cash disbursement in an envelope suitably endorsed 5-37.
by a rubber stamp and possibly placed with the ordinary wages, if any.

Accident compensation will also be paid separately as a petty cash disbursement.

A point may be mentioned as to computing wages figures to the

Wages.

nearest halfpenny. With the advent of the National Insurance Act halfpennies cannot be altogether avoided in the wages totals, and that being so, it is quite as well to compute the time wages accordingly, though hardly the extra pay. There is, of course, the difficulty of getting the requisite number of halfpence from the bank, as it is a matter of chance how these come in the five shilling bags of copper.

It is supposed that there will be two clerks in attendance at each pay station—one the pay clerk handing out the money and the other receiving the pay cards and cancelling them by a crayon mark across the corner.

Pay cards cancelled by payment at any other time can be punched or clipped to obviate any confusion with unpaid cards.

Pay cards can be placed with the current time cards in the recorder racks during the meal-time immediately preceding pay time—that is, at dinner time when pay is made Friday night.

It is better generally to pay on Friday night rather than Saturday morning in the domestic interests of the men, and in the interests of the office arrangements, so as to avoid the total dislocation of office routine during practically the whole Saturday morning. When pay is made Friday nights the pay clerks have the full morning clear of interruption for their ordinary work, and Saturday morning becomes in turn more useful than the lost Friday afternoon. This is particularly so when the pay arrangements are well organised and the time of making up reduced to a minimum.

After the pay is over the Pay Clerk, before handing in any un-
5-34. claimed wages, will enter the items on an Unclaimed Pay Report, keeping a carbon copy of same. This note will be handed in to the General Office with the money and the total signed for. The note will be suitably filed. Claims afterwards will involve the pay card being obtained from the Wages Office and handed in to the General Office as a voucher, the necessary receipt being given on the respective Unclaimed Pay Report.

Other points in the pay routine will be sufficiently suggested by the suggested Standing Office Instructions in this connection given in Section III a.

National Insurance.

The National Insurance Act, 1911, is a measure of very far-reaching effect, and necessarily complex in view of its compulsory application, as regards health insurance, to practically all persons between the ages of 16 and 65 engaged in manual labour or earning not more than £160 per annum.

The application of the Unemployment Section (Part II. of the Act) is limited at present to certain trades. According to the

National Insurance.

First Unemployment Insurance Report, the number of Unemployment Books issued up to 12th July, 1913, is as follows :

Trade.	Total for United Kingdom.
Building - - - - - -	861,408
Construction of Works - -	186,260
Shipbuilding - - - -	274,228
Engineering - - - -	865,563
Construction of Vehicles - -	216,028
Sawmilling - - - - -	19,118
Other Industries - - - -	86,334
Total - -	2,508,939

No attempt can be made here to furnish a guide to the working of the Act, but merely to give a few extracts from official sources, indicative of employers' responsibilities, so that the reader may appreciate the bearing generally that this Act has on Works administration.

Under certain conditions exemption certificates are granted, and the employer's interest is only touched by having to recognise these certificates when presented by their employees and to see that same are in order. The certificates have to be renewed every twelve months.

In the case of compensation paid by the employer in respect to an accident, the employee as insured under the Health Section of this Act, will only be entitled to sick pay if the weekly compensation payments are less than the sick pay under the Act, in which event he is entitled to the difference between the compensation payment and the full sick benefit.

The employer needs to bear in mind that in the event of an agreement with an injured employee as to a weekly compensation less than 10s. per week (the sickness full benefit), or as to the redemption of the weekly payments by a lump sum, notice of such agreement must be sent within three days to the Insurance Commissioners. This is arranged between the insurance company with whom the employer has taken out a policy to cover his liabilities in respect to accidents to employees and the employee's own sick society.

Under certain regulations employers may pay at reduced rates if they undertake to pay full wages during sickness for six weeks in any one year—the sick person receiving no sick benefit until the end of this period. So far as this arrangement might be considered for staff, probably the better course is to give no undertaking to pay in full for a maximum of six weeks' wages, but rather to request the staff that during the period of absence for which they are paid full wages, they shall refund the amount they obtain from the State in the way of sick pay.

This is fair in that a staff employee should not receive more than

National Insurance.

full wages during sickness and goes to compensate the employer in foregoing the reduced insurance rates without adversely affecting the employee.

The following extracts are taken from the Health Insurance Contribution Cards for men, (January 1914 Edition). The cards are arranged to cover six months' contributions, the spaces for each week's stamps being numbered and dated.

NATIONAL HEALTH INSURANCE CARD (CLASS A) INSTRUCTIONS.

Cancelling Stamps.

The employer is required, immediately after affixing a stamp to a card, to cancel the stamp by writing in ink or stamping with a metallic die with black indelible ink or composition across the face of the stamp the date upon which it is affixed, and in the case of an Emergency Card he must in addition write the name of the worker across the face of the stamp. Aniline inks must not be used when cancellation is effected by means of a metallic die. Rubber stamps are not allowed. Beyond cancelling the stamps in this way the employer must not make any writing or other mark on the card or stamps.

Custody and Return of the Cards.

There are two ways of arranging for the custody of the card during its currency. The first is for the employer and worker to agree that the employer shall keep the card, in which case he is responsible for its safety; he must stamp it regularly at the proper times and must return it to the worker—

(*a*) Upon the termination of the employment;
(*b*) Upon the expiration of the period of currency of the card; and
(*c*) Where the worker so requests, within 48 hours after the receipt of the request.

The other way is for the worker to keep the card, and this *must* be done unless the employer and worker agree that the employer shall keep it. When the worker keeps his card the employer must return it to him as soon as he has stamped it on each occasion of stamping.

If the card of a worker who has left his employment is in the possession of his employer the employer should, if he is unable to return the card to the worker, forward it to the Insurance Commissioners. On the death of a worker whose card is then in the hands of his employer, the card should be forwarded to the Commissioners as soon as possible.

Supply of Stamps.

National Health Insurance Stamps are on sale at all Post Offices. Stamps other than National Health Insurance Stamps found affixed to this Card will not be accepted in payment of Contributions.

Rate of Contribution.

The normal rate of Contribution in Great Britain is 7d. per week, divided as follows:

Payable by the Employer	3d. a week.
Payable on behalf of, and recoverable from, the Contributor	4d. a week.

The joint Contribution payable by the employer is 6d. a week in the case of a male employed contributor

who is 21 years of age and over and
whose remuneration does not include board and lodging and
the rate of whose remuneration does not exceed 2s a working day.

If a contribution of 6d. is payable, a special A(L) Card should be stamped.

Time of Affixing Stamps.*

A Weekly Contribution is payable by the employer for each week (commencing Monday) during the whole or any part of which the contributor has been employed, but only one contribution is payable for each week, and no contribution is payable by the employer in respect of any week during which the contributor renders no service and either (*a*) receives no remuneration or (*b*) receives Sickness Benefit for the whole or any part of the week.

The employer must, before any payment of wages, affix in the proper space a single National Health Insurance Stamp of the value of the joint weekly contribution of himself and the contributor for each week (commencing Monday) for the whole or any part of which the wages are payable and in respect of which a Stamp has not already been affixed.

The number of Stamps to be affixed will be the number of Mondays for which spaces are provided on this Card and which fall within the period for which wages are payable. When the employment begins on a day of the week other than Monday, a Stamp must also be affixed for that week if a Stamp has not already been affixed for that week.

Upon the termination of an employment, or at any time within 24 hours after demand by the contributor, a Stamp must be affixed in respect of each week for which a contribution is payable by the employer.

All contributions payable in respect of the period to 5th July, 1914, must be paid and Stamps affixed within six days after that date.

When no wages are payable by the employer, he must affix a Stamp on the first day of employment in each week for which a contribution is payable.

* Employers who are allowed by the Commissioners to deposit with them a sum equal to the value of the contributions are subject to special Regulations as to time of stamping.

National Insurance.

EMPLOYER'S CONTRIBUTION NOT RECOVERABLE.

Notwithstanding any contract to the contrary, the employer is liable to a penalty if he deducts or attempts to deduct from the Wages of or otherwise to recover from the contributor the employer's contribution or any part of it.

CHANGE OF ADDRESS.

A contributor changing his address during the currency of this Card should alter the address on page 2, and within seven days inform his Society or, if he is not a member of a Society, the Insurance Commissioners.

DEFACING CARD.

Except as otherwise provided by Regulations, no mark of any kind may be made on this Card, nor may anything be affixed to it by the employer or contributor or any other person. If a Card is accidentally damaged or defaced it should be exchanged for a new one.

ASSIGNMENT OR TRANSFER.

No person may assign or charge, or agree to assign or charge any Card, and any sale, transfer or assignment of, or charge on any Card is void and of no effect.

If any employer has failed to pay any contributions which he is liable to pay in respect of an employed contributor, he is for each Offence liable on Summary Conviction to a fine not exceeding TEN POUNDS, and to pay a sum equal to the amount of the contributions which he has failed to pay.

Further, if the contributor is a member of an Approved Society, he may take proceedings against his employer, in which case the employer may be compelled to make good any loss of Benefits which the contributor has suffered.

If any Insured Person without reasonable cause fails to deliver a Contribution Card to his employer at the times required by the Regulations, or is guilty of any other contravention of or non-compliance with any of the requirements of the National Insurance Acts, 1911 to 1913, or the Regulations made thereunder in respect of which no special penalty is provided, he is for each Offence liable on Summary Conviction to a fine not exceeding TEN POUNDS.

Every person who buys, takes in exchange, or takes in pawn from an Insured Person, or any person acting on his behalf, on any pretence whatever, any Insurance Card is liable on Summary Conviction to a fine not exceeding TEN POUNDS.

In the case of the special A(L) Card referred to above, which has to be used when the joint contribution is at the rate of 6d. per week, the instructions on the card include the following:

SPECIAL USE OF CARD.

This Card is for use in the case of a male employed contributor in respect of whom contributions are payable at the rate of 6d. a week, but if for any week contributions at the normal rate are payable they may be paid on this Card.

An employer who pays contributions at the rate of 6d. a week must inscribe his initials above the Stamps and give a Certificate in the space provided.

The Card must not be used where the employer is authorized to pay contributions at the reduced rate by reason of undertaking to pay full remuneration to the Contributor during sickness. In this case a Class "A" Card should be used.

CASES IN WHICH THE JOINT CONTRIBUTION PAYABLE BY THE EMPLOYER IS 6d. A WEEK.

The joint contribution payable by the employer is 6d. a week in the case of a contributor
who is 21 years of age and over, and
whose remuneration does not include board and lodging, and
the rate of whose remuneration does not exceed 2s. a working day.

Remuneration includes any food or other benefits to which the contributor is entitled in return for his services.

Rate of remuneration is the rate for a full working day in the employment of the employer who is liable to pay the contributions. (*See* Leaflet No. 18 and Form X84, to be obtained from the Commissioners.)

The Contribution of 6d. is divided as follows:

—	Where rate of remuneration exceeds 1s. 6d., but does not exceed 2s. a working day.	Where rate of remuneration does not exceed 1s. 6d. a working day.
Payable by the Employer	5d.	6d.
Payable on behalf of, and recoverable from, the Contributor	1d.	Nil.

This Card must not be used for Contributors under 21 years of age.

The corresponding cards for women are marked Class E and Class E(L) respectively. The instructions are practically identical

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in all but the rates, as to which the following extracts will suffice:

WOMEN, CLASS E.

The normal rate of contribution in Great Britain is 6d. per week, divided as follows:

Payable by the Employer - - - - - - - - -	3d. per week.
Payable on behalf of, and recoverable from, the Contributor - -	3d. per week.

WOMEN, CLASS E(L).

The joint contribution payable by the employer is 5d. a week in the case of a contributor
who is 21 years of age and over, and
whose remuneration does not include board and lodging, and
the rate of whose remuneration does not exceed 2s. a working day.

Remuneration includes any food or other benefits to which the contributor is entitled in return for her services.

Rate of remuneration is the rate for a full working day in the employment of the employer who is liable to pay the contribution.

The contribution of 5d. is divided as follows:

—	Where rate of remuneration exceeds 1s. 6d., but does not exceed 2s. a working day.	Where rate of remuneration does not exceed 1s. 6d. a working day.
Payable by the Employer - -	4d.	5d.
Payable on behalf of, and recoverable from, the Contributor - -	1d.	Nil.

This Card must not be used for Contributors under 21 years of age.

The special regulations as to the time of stamping (see page 110) are indicated by the following extracts from the official Pamphlet A (revised Jan. 1914).

SPECIAL ARRANGEMENTS FOR STAMPING.

(*a*) *Half-Yearly Stamping.* Where an employer, by agreement with his employees, retains their cards during the period of their currency, the Commission are prepared, subject to certain conditions, to allow him to deposit with them, either in one amount or in weekly instalments, a sum sufficient to meet the contributions payable in respect of the employees during the period of currency of the cards. At the end of the period in respect of which the deposit is made, the employer will be supplied with stamps to the value of the deposit and will be required to stamp the cards in payment of all contributions payable for the period. High-value stamps, of suitable denominations, will be issued for this purpose. Where a deposit is made under arrangement with the Commission, the employer will be deemed to have paid the contributions at the due time, but notwithstanding any such arrangement the employer will still be liable to stamp the card of any employee on the termination of the employment and at any time on request by the employee subject to 48 hours' notice. The minimum deposit which can be received from employers under this special arrangement will be in respect of 100 employees. Further information on this subject can be obtained on application to the Insurance Commission.

(*b*) *Stamping Weekly after Payment of Wages.* Information may also be obtained from the Commission as to the special arrangements which may be made whereby the contribution cards of employees may, on payment of a deposit in respect of at least 100 employees, and under certain conditions, be stamped in the week following that in which the wages are paid.

Coming to the Unemployment section of the Act, the following is an extract from an official circular (May, 1912).

NATIONAL INSURANCE ACT, 1911.—PART II.
UNEMPLOYMENT INSURANCE.
DIRECTIONS FOR EMPLOYERS.

Every employer of a workman in an insured trade will be liable to pay contributions under this part of the Act on his own behalf and on behalf of the workman. Women are included, but foremen (except those engaged wholly or mainly by way of manual labour), clerks, indentured apprentices, and workpeople under 16 years of age are excluded.

THE COMPULSORILY INSURED TRADES.

1. BUILDING: that is to say, the construction, alteration, repair, decoration, or demolition of buildings, including the manufacture of any fittings of wood of a kind commonly made in builders' workshops or yards.
2. CONSTRUCTION OF WORKS: that is to say, the construction, reconstruction, or alteration of railroads, docks, harbours, canals, embankments, bridges, piers or other works of construction.
3. SHIPBUILDING: that is to say, the construction, alteration, repair, or decoration of ships, boats or other craft by persons not being usually members of a ship's crew, including the manufacture of any fittings of wood of a kind commonly made in a shipbuilding yard.

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4. MECHANICAL ENGINEERING : including the manufacture of ordnance and firearms.
5. IRONFOUNDING : whether included under the foregoing headings or not.
6. CONSTRUCTION OF VEHICLES : that is to say, the construction, repair or decoration of vehicles
7. SAWMILLING (including machine woodwork) carried on in connection with any other insured trade or of a kind commonly so carried on.

Attention is drawn to Section 107 (2) of the National Insurance Act which reads as follows :

> "In determining any question as to whether any trade in which a workman is or has been employed is an insured trade or not, regard shall be had to the nature of the work in which the workman is engaged rather than to the business of the employer by whom he is employed."

Employers should take steps to ascertain whether any workman or class of workmen in their employ are included in the list. If there is any doubt, further information can be obtained at the nearest Labour Exchange either personally or by letter, and a form can be procured there, on which application can be made to the Umpire for a definite decision.

The instructions appearing in Unemployment Books necessarily vary from those on the Health cards, and are quoted below practically in full. The books last for a year.

NOTES AS TO USE OF UNEMPLOYMENT BOOK.

On obtaining employment in an insured trade the workman must give this book to his employer.

On becoming unemployed the workman must lodge this book at a Labour Exchange or other local office of the Unemployment Fund, and leave it there till he again obtains employment in an insured trade.

The employer is bound to affix the necessary stamps to this book, and to cancel them as required by Regulation 8 (3) (see back of book) ; and on recovering the book on the termination of employment the workman should make certain that the necessary stamps have been affixed. His claim to benefit depends upon the number of stamps affixed by his employer.

No stamps may be affixed for periods during which the workman is unemployed, and any stamps affixed in such circumstances will be disallowed when reckoning benefit.

Unemployment Insurance Stamps only may be affixed to this book. Any other stamps, *e.g.* Health Insurance or postage stamps, do not count as contributions in respect of Unemployment Insurance.

EXTRACTS FROM THE REGULATIONS.

The employer on obtaining the book shall become responsible for the custody of the book so long as the employment continues, or till the book is returned to the workman or delivered to the local office in accordance with these Regulations.

If any workman desires to inspect his book while it is in the custody of the employer, the employer shall, subject as hereinafter mentioned, give him a reasonable opportunity of so doing either within or immediately before or after working hours.

Provided that no workman shall be entitled by virtue of this provision to inspect his book more than once in any one month nor except at such time as may be fixed by the employer for the purpose.

(1) On the termination of the employment of any workman for any cause other than his death the employer shall forthwith return the book to the workman without any note or mark of any kind made in, affixed to, or impressed on it, other than any such mark as is required for the purpose of cancelling in accordance with these Regulations any stamp affixed to the book.

The workman on the termination of his employment shall apply to the employer for the return of his book, and on the book being returned to him, shall give to the employer, if he demands it, a receipt for the book.

An employer shall comply with any direction which may be given by the Board as to the return to a workman of his book at any other time than on the termination of his employment.

Subject to any directions of the Board to the contrary, the workman to whom a book is returned under the foregoing provisions shall, if he is unemployed, forthwith deliver it to a local office, there to be retained till the workman again obtains employment in an insured trade.

If for any reason the book is not returned to the workman in accordance with this Regulation on the termination of his employment, the employer shall, as soon as may be, deliver the book to a local office.

(NOTE.—The expression "termination of employment" means the day on which the employment is actually terminated either by the employer dismissing the workman or by the workman leaving his work, whether such termination is in accordance with the terms of the contract of service or not.)

On the death of a workman, the employer, if the book is then in the custody of the employer or if the book is not then in the custody of the employer, the workman's representative, whether legally so constituted or not, shall forthwith deliver the book to a local office.

A book shall be issued without charge to a workman properly applying for a book, and when issued shall remain the property of the Board.

A book shall be in such form as the Board direct, and shall be current only during such period, not exceeding fifty-three weeks from the date of the issue thereof, as may be specified thereon, and shall within seven days, or such longer time as the Board in any special case allow after the date in which it ceases to be current, be returned by the workman, or by the employer on his behalf, to a local office, and a fresh book shall thereupon be issued without charge to the person so returning the book.

Provided that, where the book on the date on which it ceases to be current is in the custody of the employer, he shall, if the workman so requires, instead of returning it to a local office return it to the workman to be by him returned to a local office.

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For the purpose of making the proper payments required to be made by an employer in respect of contributions under Part II. of the Act, the employer shall, on or before the first payment of wages to a workman, and on or before each subsequent payment of wages in respect of the employment, affix to the book stamps of such value as may be necessary to make the total value of all stamps so affixed equal to the following amounts:

(i) In the case of a workman not below the age of eighteen—

For every period of employment in respect of which wages are payable—

If exceeding two days, but not exceeding one week	5d.
Exceeding one day, but not exceeding two days	4d.
Not exceeding one day	2d.

(ii) In the case of a workman below the age of eighteen—

For every period of employment in respect of which wages are payable not exceeding one week	2d.

Provided that:

(*a*) on the termination of employment, whether or not any wages are then paid, stamps shall be affixed by the employer in respect to any part of the period of employment in respect of which stamps have not already been affixed; and

(*b*) where the first payment of wages takes place before the completion of a week of employment but the employment is a continuing one, the employer may, at his option, either treat the period of employment in respect of which the first payment of wages is made as a separate period of employment or may affix stamps as for a full week of employment; and

(*c*) where wages are paid to a workman at intervals shorter than a week, the employer shall not after the first payment of wages (subject always to his obligation to affix stamps on the termination of employment) be required to affix stamps more frequently than at weekly intervals; and

(*d*) where the employer employs any workman regularly, he may deposit with the Board a sum equal to the estimated amount of the contributions payable by him during a period of three months, or such less period as may be agreed between him and the Board, in respect of those workmen both on his own behalf and on behalf of those workmen.

On making such a deposit the obligation of the employer to stamp the books of those workmen on the occasions or at the intervals hereinbefore specified shall cease, and in lieu thereof he shall be liable according to the special regulations applying to this arrangement.

No stamp shall be affixed to or be impressed upon a book otherwise than in respect of employment in an insured trade, and any stamp affixed or impressed otherwise than in respect of such employment shall not be deemed to be a payment of a contribution under Part II. of the Act.

Every adhesive stamp affixed to a book by an employer shall be cancelled by him in the same manner in which stamps affixed to a book or card for the purpose of the payment of contributions under Part I. of the Act are required to be cancelled by any Regulations made under that part of the Act and for the time being in force for the cancellation of stamps so affixed to a book or card under Part I. of the Act, then in such manner as the Board may direct.

Where no wages are paid to a workman but he receives, in respect of his service, board or lodging or any other remuneration, stamps of the value required by this Regulation shall be affixed on the termination of the employment, or, in the case of employment which lasts more than one week, on the last day of employment in each calendar week.

The employer shall be entitled, notwithstanding the provisions of any Act or any contract to the contrary, to recover from the workman, by deductions from the workman's wages or from any other payment due from him to the workman, an amount equal to one-half of the value of any stamps which have been, or which, by virtue of these regulations are deemed to have been, affixed by him to the workman's book.

Where during any period a workman has been employed by one employer partly in an insured trade and partly not in an insured trade, and contributions have by arrangement between the employer and the workman been paid as if the whole employment of that workman were in an insured trade, those contributions shall be deemed to have been duly paid in respect of employment in an insured trade.

The Act provides for a refund of a certain proportion of the employer's contribution in respect to unemployment. The main points are given in the following extracts from a memorandum issued June, 1913, which is liable to revision at any time.

PART II.—UNEMPLOYMENT INSURANCE.

REFUNDS TO EMPLOYERS.

STATUTORY PROVISIONS.

Section 94 (1) of the National Insurance Act, 1911, provides as follows:

> The Board of Trade shall, on the application of any employer made within one month after the termination of any calendar year, or other prescribed period of 12 months, refund to such employer out of the unemployment fund a sum equal to one-third of the contributions (exclusive of any contributions refunded to him under any other provisions of this Part of the Act) paid by him on his own behalf during that period in respect of any workman who has been continuously in his service through the period, and in respect of whom not less than forty-five contributions have been paid during the period.

Regulation 23 of the Unemployment Insurance Regulations, 1912, defines the prescribed period of 12 months referred to in Section 94 (1) as follows :

> The period of twelve months within one month of the termination of which an application under Section 94 must be made shall be the period of twelve months ending on the 14th day of July in any year.

CONDITIONS ENTITLING EMPLOYER TO CLAIM REFUND.

The two following conditions must be satisfied with regard to each workman in respect of whom the employer claims a refund under Section 94:—

(1) The workman must have been continuously in the service of the employer claiming the refund through the period of 12 months ending on July 14th, 19.....

(2) During that period not less than 45 contributions must have been paid in respect of the workman by the employer claiming the refund.

Both these conditions must be satisfied in each case.

First Condition : Continuity of Service.

The essential matter in this connection is that the contract of service of the workman with the employer should not have been broken. Where there has been an interruption in the rendering of services by the workman (*e.g.* owing to sickness, holiday, etc.) the question whether the contract of service has been broken or not will, in general, depend upon whether the workman is entitled to resume his services and the employer is entitled to require him to do so on the termination of the period of interruption.

For instance, in the following cases the continuity of service will, in general, be regarded as unbroken :

Where a workman is away from work owing to holidays or sickness, with or without pay, provided that he is bound to return to work and actually does so on the termination of the period of holiday or sickness.

When a workman is away from work owing to training with the Naval Reserve, the Army Reserve, or the Territorial Force, and is bound to return to work and actually does so on the termination of the period of training.

Second Condition : Payment of 45 Contributions.

In order that this condition may be satisfied it is necessary that a total amount of not less than 45 times 2½d., *i.e.* 9s. 4½d., must be paid by the employer on his own behalf; in other words, except where a Section 99 arrangement has been in operation, it will be necessary that the total value of the stamps affixed by the employer to the workman's book should be not less than 45 times 5d., *i.e.* 18s. 9d. It is not essential that all the stamps should be 5d. stamps ; 4d. and 2d. stamps may be counted towards making up the required total.

Where a Section 99 arrangement has been in operation for the whole or part of the twelve months ending July 14th, the amount paid by the employer on his own behalf *under the arrangement* will be taken as the basis for reckoning the number of contributions paid by him during the period for which the arrangement was in force. Thus an adult six-day stamp would count as one contribution, an adult five-day stamp as five-sixths of a contribution, an adult four-day stamp as four-sixths, and so on.

METHOD OF APPLYING FOR REFUNDS.

Applications for refunds must be made on the prescribed forms within one month after July 14th, 19...., *i.e.* not later than August 14th, 19..... The necessary forms and instructions for making these applications will shortly be obtainable at all Labour Exchanges and other Local Offices of the Unemployed Fund. When the forms are completed they should be handed in at the nearest Labour Exchange or other Local Office.

The particulars that will be required on the forms of application will be :

(1) The initials and surname of each workman in respect of whom a refund is claimed.

(2) Particulars of the Unemployment Book of each workman, viz., the number (including initial number and letter, *e.g.* $\frac{1}{A}$ 99999) and the Division of Issue.

(3) Details of the numbers or stamps of each denomination representing contributions paid by the employer in respect of each workman during the twelve months ending July 14th, 19.....

(4) (*So far as may be required*) particulars of periods (if any) in respect of which no contributions were paid by the employer, with reasons in each case why no contribution was payable.

In the case of Section 99 arrangements, sheets kept at the Labour Exchange contain a record of the workman's name, the number of his unemployment book, and the number of days worked by him during each week under the arrangement. Subject to the convenience of the Exchange these sheets will if desired be lent to the respective employers for the purpose of making out applications for refunds under Section 94.

In order to verify the fact that the contributions in respect of which the application is made were duly paid by the applicant during the prescribed period and that the workmen were continuously in his service through this period, the Board of Trade reserve the right to examine the applicant's books of account in so far as may be necessary for that purpose ; and employers making an application for a refund under Section 94 must be prepared to produce their books of account accordingly to any duly authorised officer of the Board.

When short time is being worked, some relief may be obtained under Section 96 of the Act in respect to the unemployment insurance payment as indicated in the following extract from that section :

If any employer satisfies the Board of Trade that during any period of depression in his business workmen employed by him have been systematically working short time, and that

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during such period he has paid contributions under this Part of this Act on behalf of such workmen, as well as on his own behalf, without recovering such contributions from such workmen either by way of deductions from wages or otherwise, there shall be refunded to him out of the unemployment fund, in accordance with regulations made by the Board of Trade, the contributions so paid by him in respect of those workmen (including those paid on behalf of the workmen as well as those paid on his own behalf) for the period or such part thereof as in the circumstances may seem just.

For large employers, probably the best alternative to weekly stamping of the Unemployment books by the employer is to take advantage of the arrangements afforded by the Board of Trade under Section 99 of the Act, through the Labour Exchange. The economy of this scheme is very marked, particularly when any volume of casual labour is employed and in holiday weeks when short time is being worked.

Arrangements with the Labour Exchange (under Section 99).

Employers may make arrangements with a Labour Exchange for the duty of keeping and stamping the books of insured workmen to be undertaken by the Exchange. Such an arrangement may apply to all workmen in the service of an employer at the time of an arrangement or subsequently engaged by him through the Exchange. Under such an arrangement in the case of casual workmen, different periods of employment, whether of the same workman different workmen, may for the purposes of the employer's contributions be treated as a continuous employment of a single workman.

A charge is made for this service in regard to Health cards. No charge will be made for stamping Workmen's Unemployment book until July, 1917.

As to the actual stamping of the cards, the ordinary way is to affix the stamps each week, and this ought to be done before the wages for the week are paid.

Regulations have now been made by the Insurance Commissioners (see page 112) whereby the stamping of insurance cards may be deferred until the week following that in which the wages are paid. This hardly alters the problem of stamping, but is likely to meet the convenience of the Wages Office arrangements.

The outstanding difficulty in regard to this matter is to make sure of the precise denomination of the stamp necessary in any given week if the man has been absent any part of the week. The difficulty only arises in that the insurance week is a calendar week commencing on the Monday, officially defined to be from "midnight on one Sunday to midnight on the following Sunday," whereas the wages week is an arbitrary one, more usually commencing on a Thursday. So far as health insurance stamps go, to have worked on any one day makes the full rate stamp necessary, unless already affixed in the same calendar week.

It is requisite to make up the record on which the stamping is based in such a way that absence on Thursday, Friday and Saturday is distinguished from absence on Monday, Tuesday and Wednesday, assuming the wages week to end on Wednesday. The point to be remembered is that the stamp affixed each calendar week covers the Monday, Tuesday and Wednesday only of the week for which

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wages are being paid, while it also covers the Thursday, Friday and Saturday belonging to that calendar week but for which wages are not paid until the next week. In considering the question of what stamps have to be affixed at the end of any week, it will be simpler to consider that only three days are in question, viz., Monday, Tuesday, and Wednesday (always supposing the wages week ends on Wednesday). It may be taken that the preceding Thursday, Friday and Saturday have been covered by the stamping for the preceding calendar week. Of course, a man starting work on Thursday, Friday or Saturday for the first time in that calendar week, would require stamps for that calendar week and again stamps in respect to his work on the following Monday, thus necessitating two week's stamps to be affixed on his first pay day in respect to only one week's work (so far as wages payment is concerned).

In dealing with Unemployment stamps, the matter is rather more involved in that the stamp values vary according to whether one, two, or more days are worked in the calendar week By the use of a sheet arranged to show the absence of each man on the lines indicated above, it is not difficult to see what value of stamp is required. It will help to an understanding of this suggestion if the reader will turn to the specimen Workman's Rate Sheet—Form 5–19.

By this scheme provision is made for checking the entries of stamp values in the Wages Book, and also the actual stamps affixed to the cards.

From the Workman's Rate Sheet, the particulars necessary to quarterly stamping, stamping at Labour Exchange and for claiming refunds under the Unemployment section, can be readily obtained. 5-31.

Emergency Health Insurance cards are obtainable by the employer from any post office, and must be used if the man's proper card is not available.

The employer is not able, however, to obtain temporary Unemployment books, and the remedy is to allow no man to start work without his book or a Labour Exchange Receipt Card, for his Unemployed Book, which the employer signs and sends by post to the Labour Exchange named. The Unemployed Book is then sent to the employer. The man may possibly be supplied with a temporary book from the Labour Exchange, but the employer has no part in the arrangement.

Design.

Design, as a commercial proposition, is largely a matter of evolution, of development virtually by the process of trial and error. The basis of the trial should be calculation, but trial alone can hall-mark the design.

A good deal of designing is apt to be done on false premises, because previous designs have not been absolute failures, and the importance of calculation is as undeniable as the necessity for experience.

It might be remarked here that each designer or draughtsman should be provided with bound books in which to record calculations. The notes should be legibly entered, and the books kept carefully for reference. They should be large enough (say foolscap size) to make loss or misappropriation more difficult.

Designing is hardly synonymous with invention although the efficient designer must have inventive ability. More frequently the application of this ability is in what may be termed a geometrical direction as to proportions, combination and arrangement.

In inventing new arrangements the designing considerations must largely be the feasibility of production. No designer ought to arrange any mechanism without a clear conception of how he himself would produce each component with the tools at the command of the shop in which it is to be produced. Apart from the machining proposition, there are frequently those of patternmaking and casting, not to mention fitting and erecting.

The checking of patterns by the designer is an important education to him, and should be carried out if possible.

Similarly, too, the designer needs frequently to follow new jobs through the shops, more especially at the fitting or assembling and erecting stages.

In some classes of work the only criterion of design is judgment formed from experience, observation and analogy, and this can only be fully exercised on a full-size drawing. For this reason it is of great importance to have a large blackboard, scored like squared paper, on which the main lines can be settled of pieces too large to be dealt with on a sheet of drawing paper.

Standardisation in design does not appeal to a designer as a controlling influence on his work, as it tends to rob him of the stimulus that lies in efforts in new directions. Against this has to be set the commercial limitations of any firm's practice if it would be financially successful and, from the production point of view, the importance of standardisation in design can hardly be overrated.

Standardisation hardly means that designs as a whole shall be stereotyped, but rather that numberless details shall be selected from a specified range of standard shapes and dimensions. The principle is no more than that involved in adopting a standard screw thread instead of a non-standard one.

Design.

The work of the Engineering Standards Committee has gone far towards standardising matters for the whole community, with the consequent advantage in purchase costs, in place of each Works fixing its own standards.

There are yet and must always be a number of details capable only of local standardisation.

Such details as are standardised should be tabulated and drawn out on tracings, and bound volumes of prints from these tracings loaned to each draughtsman.

An important detail of standardisation in design is the adoption of a limited range of materials, as this has a considerable influence on purchases and stock control.

In some offices designs are drawn out in outline as the designer would have them, were he free to choose, and then a checker goes through to indicate the standard components to be used—necessitating a recast of the design and a possible loss in appearance with a big gain in production economy.

The standardisation of components peculiar to certain classes of mechanism, as distinct from the standardisation of fittings of quite general application, requires much care. The main considerations are the use of patterns, jigs and special tools for more than one job. It is a little dangerous to think of using these on more than one design of complete product, lest some seemingly trifling alteration for a later design shall spoil their application to the original design.

The feature in design likely to be most fruitful of economy in production is adherence to dimensions for which standard tools and gauges are available. Standard in this connection may mean only local standards, but should preferably mean standards in general use, as this enables tools to be bought outside when manufacture of the tools in the Works might be too inconvenient, just as it will frequently be too costly, if costs are counted properly. Facilities have increased latterly for buying special tools, with possible gains in point of both quality and costs.

Standardisation in component design will be facilitated by grouping together prints of components of similar shape, apart from purpose, though this pre-supposes that unit drawings of the individual are available.

The following are a few typical classes under which these designs

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may be grouped—with subdivisions as necessary to facilitate reference :

Shafts.
Couplings.
Levers, Links and Fork Ends.
Brackets.
Covers and Doors.
Springs.
Bolts, Nuts, Washers and Fastenings.
Gear Wheels.
Bushes.
Stuffing Boxes.
Liners, Adjusting and Distance Pieces.
Pipes, Flanges and Connections.

As the data accumulates, the main dimensions can be tabulated
5-40. on Design Comparison Sheets and incorporated in the draughtsman's reference book.

When any one component is applied to various products the problem arises of keeping an historical record of these applications, also as to corrections and changes, metals and so on. To this end
5-42. Component History Cards are necessary.

Associated with such a record should be a synopsis of complaints arising under guarantees and in connection with repair work. This may necessitate a daily report of "Parts Complained of" from
5-43. the Repairs Department to the Drawing Office, or alternatively, made up in the Drawing Office from the letters of complaint.

In leaving this aspect of the present subject, emphasis may very well be laid on the detrimental influence on the supply of spare parts occasioned by changes in standard designs. Hasty adoption of standard design is most likely to lead to repentance at leisure. An ultra-cautious attitude in the inception of a design and a firm stand afterwards against alterations, unless absolutely forced by some unforeseen failure in service, are practically imperative conditions for production efficiency and, in the long run, of financial success. Courage to make improvements needs to be coupled with courage to carry through the proposed improvement as an experiment before incorporating it in any standard product. Ingenuity in the direction of alterations should be at a discount when designs have been established, and the proper striving after greater efficiency in design must be somehow synchronised, as to its effect on design, with the experimental or development stage prior to adopting a completely new design. The point is to make no improvements without due deliberation, and only at the appropriate moment, so as to conserve the true interests of production and the general selling policy. Lack of method or organisation often prevents this truism becoming effective, without there being any set intention to ignore considerations pertaining to production.

Some manufactures seem never to have had an initial development stage, and designs are perpetuated that reflect equally the lethargy of the manufacturer and of the buying public.

This fixity of design might be expected to help production, and so far it does, but it probably bars the way to any marked efficiency

Design.

in that direction. Production efficiency is interdependent with design efficiency in various directions mainly, perhaps, as to standardisation of details.

The impetus to improvements in design should frequently arise from the endeavour in the Works to produce efficiently, and these suggested improvements, alike with those arising in the Drawing Office or from tests, must wait their proper time for incorporation. A suitable routine requires to be established whereby all desirable improvements shall be reported to the Drawing Office and recorded there in a manner not likely to allow them to be overlooked, when fresh manufacturing orders are being placed. The Component History Card previously mentioned may provide a suitable medium, though the reference print of the component in question may be a safer medium. This point, like many others, is rather one of habits and expediency than of principle.

The application of any of the preceding remarks to special product must depend on circumstances. Special product may be taken as being special in being subject entirely to the customers' specification. The range possible in the manner of this class of specification is so wide that discussion is rather futile beyond remarking that in the highest specification, short of sealed drawings or samples that may on no account be varied, there will be scope for applying some measure of standardisation in preparing the drawings for the Works.

In the matter of drawings sent in by customers, it may be remarked here, in passing, that these should never be issued into the Works but always traced or possibly re-drawn to conform with local standard practice. The extra work is independently enforced, if proper regard is paid to the safe custody of the customer's drawing for reference purposes.

Functions of Drawings.

The functions of a drawing are to convey dimensions and arrangement in sufficient detail to enable the desired product to be made, and be made properly.

Many drawings are very incomplete as to dimensions, usually for want of sufficient practical knowledge on the part of the draughtsman to embody the essential requirements in definite figures. Views will differ as to what are definite figures. Quite frequently the patternmaker will permanently fix many dimensions, that will approximate to, rather than be identical with, the drawing. Apart from the pattern there may be fluctuating variations of dimensions in the casting. These variations may be no more than is quite acceptable, but on the other hand, the permissible variation may be quite small in some cases. Obviously, however, it is a point in good design not to set up needlessly difficult conditions in production.

Functions of Drawings.

The subject of machining allowances on castings and forgings calls for careful consideration. In general these allowances err on the heavy side.

The question of dimensions more commonly is one of machined surfaces, and here again the various machinists concerned could very easily interpret the drawing dimensions so differently as to make an unsatisfactory job, if not to spoil the product. The accumulated experience of the shops as represented by the foreman and others, goes far to obviate these difficulties, by working within certain limits of error, or variation from drawing size. Whether the permissible variation be large or small, the fact remains that the dimensions given on the drawing are very rarely reproduced exactly in the product. It might be said that they are never exactly reproduced, inasmuch as there will be some fractional error of workmanship in the best work. Where two or more component pieces have to fit or work together there will need to be a certain difference of dimensions to allow of that fit or working. The necessity may be that the components shall drive one into the other, as a flywheel on a shaft, that the components shall slide one within or over the other, as a piston rod crosshead and slide, or that the components shall revolve one within the other, as a shaft in its bearing. Equally, of course, it may be a necessary condition that two machined surfaces shall be in close proximity but shall not touch. It is convenient to insert here three definitions of terms appropriate to any consideration of size limits.

Tolerance.—A difference in dimensions prescribed in order to tolerate unavoidable imperfections of workmanship.

Allowance.—A difference in dimensions prescribed in order to allow of various qualities of fit.

Clearance.—A difference in dimensions prescribed in order that two surfaces may be clear of one another.

Enough has been said to bring out the point that definite figures, in the way of dimensions, may involve in actual production a skilled interpretation of the nominal sizes usually given in the drawing. The extent to which the correct interpretation shall be registered on the drawing, or left to the shops to supply from their experience as often as required, is a matter upon which managers will differ.

As a matter of efficiency, there would seem no doubt that the correct interpretation should be permanently included in the drawing. It is not, however, always expedient to attempt this course, firstly for lack of practical knowledge on the part of designers, and secondly for lack of courage on the part of managers to face the trouble and

Functions of Drawings.

expense of settling the proper tolerances, allowances and clearances for each and every component. While tables for size limits for various classes of work are invaluable for regularising the production practice, it is dangerous to adopt any tables for general application. Each case needs to be treated on its own merit, and limits laid down accordingly. The quickest course may be to adopt suitable tables of size limits for the various classes of work, and arrange for all instances of the scale not applying to be registered in actual dimensions on the drawing.

It will be understood that the usual course in applying a table of size limits is to institute limit gauges with " go " and " not go " dimensions, the difference between these two representing the permissible tolerance. The higher of the two dimensions will represent the desired maximum allowance or clearance, as may be in question, and the lower dimension the minimum allowance or clearance.

Another highly important point arises over the interpretation of drawing sizes, namely, the production of replace parts from a drawing. If the final interpretation has been left to the shops, without any records being kept, the suitability of the replace part, in regard to the important dimensions, will hinge on whether the shop habits happen to operate the same way as originally.

In one sense there are no shop habits of accuracy, except so far as an Inspection and Viewing Department may apply a settled standard in the matter before passing the work. Here again the viewers may have a different idea from the foreman or the mechanic as to the proper dimensions, or rather the permissible limits of size in a given case.

When the shop staff have to settle these matters, they need to be reminded of the intended application of each part as to the class of fit required. To this end drawings should be issued showing the parts assembled. This means usually a drawing that is not easily read, and in no sense convenient for machining purposes. For production purposes the ideal way is a unit drawing of each component, independently dimensioned, so that the machining processes shall be facilitated, mistakes avoided, and an efficient service of drawings to the workmen made possible—the borrowing of shop drawings being almost obviated. Machined surfaces should be tinted, say in red, and the more important dimensions may even be starred, to help toward the proper interpretation of the drawing. This may help to determine the proper machining allowances on castings and forgings.

These unit drawings, however, require to be amplified beyond the giving of nominal sizes, and the classes of fit and finish required

Functions of Drawings.

must, therefore, be indicated on each. This work can be done and under most conditions it will pay to do it, though it means considerable stress on the Works Manager and Chief Designer to get such a scheme thoroughly established, and draughtsmen trained accordingly.

There will, in any case, be the necessity for drawings to be issued for assembly purposes, showing groups of components fitted together. These assembly drawings ought to be built up to correspond with the assembly unit, as it may advantageously be called, found convenient for fitting up prior to final erection.

Such assembly units should be in themselves standard, although possibly entering into various complete products, which may again be subject to the variations in customers' specifications. The scheme of assembly units is particularly applicable, where the customers' special requirements can all be met at the erecting stage —where usually it only pays to meet them if efficient production of standard articles is to be attempted.

Drawings used at one time to be always made to serve as the medium for issuing instructions as to materials of construction and the quantities required, and until latter years the shops had to count up the details requisite to make the specified " Number of sets off." There is a certain amount of convenience in a list of the components entering into an assembly unit being incorporated in the drawing of same, and such a list would naturally include particulars of materials to be used. On the other hand, it is doubtful if these are proper functions of a drawing, inasmuch as different materials may be specified for different orders and quantities required must obviously vary.

Drawing References.

The question of drawing references covers a good deal of ground, and is a distinctly important factor in works organisation. A drawing reference is essentially a means of identification of the product to which the drawing applies, and obviously can only be effective if it is absolutely definite. To obtain this precision of identification it becomes virtually imperative to adopt arbitrary symbols, to which a specific meaning may be attached. The older style of reference was to quote the name of the component in question and give the drawing number of the general arrangement in which the said component figured. This did not necessarily entail any misunderstanding in the Drawing Office, whatever might be occasioned in the Works.

A drawing number is the most obvious means of identification available for Drawing Office purposes ; it fails only as the practice grows of using a component of given dimensions in more than one design of product.

Drawing References.

In the Works, however, the means of identification require to lend themselves to being marked on foundry patterns, on jigs and special tools for producing the respective components, and further on the components themselves, when made and sent into stores. The necessity for pattern numbers, or pattern marks as they may preferably be termed, in lieu of a description associated with a drawing number, has been recognised in most works, though not in all, for very many years. The pattern problem is not so much the identification of the casting made from it in the first instance, and inferentially of the pattern itself in that stage of its existence, but rather the liability of the pattern being altered away from the original dimensions. A pattern mark has come, therefore, to mean only the identification of the pattern itself, and that in no precise way, and is not usually accepted as identifying the casting made from it. Pattern marks are more usually than not left for the Pattern Shop to apply and not recognised in the Drawing Office. Pattern records will require to be kept with the utmost care as to every alteration made in any pattern, if much advantage is to arise from the Drawing Office marking reference to any such records. In any case the Pattern Shop will have to verify every pattern as meeting the drawing requirements before issuing same to the Foundry. It will be best, therefore, for the ordinary pattern marking as carried out by the Pattern Shop to be considered as holding only good between themselves and the Foundry.

The foregoing remarks need qualifying when a part numbering scheme is adopted, for then the pattern should carry the part number in raised figures, and the part number will serve all the functions of a pattern mark.

The modern striving after standardisation necessitates that each design of component shall have its symbol for identification that is independent of the wording or phrasing of the name description. This symbol needs to be of a style adapted for marking purposes.

There are various systems of component symbols, or part Nos., and the virtues of the more elaborate ones hinge on the assumption that the uses of any component shall not vary from the original intention. These conditions of stability of complete product design are not unknown, but it may be taken as sounder practice to adopt a system that has the maximum flexibility in case of unforeseen developments. Consecutive numbers taken up arbitrarily from a Component Register as required, constitute the 5-41. simplest scheme, and affords no occasion for inconsistency however the component may be applied. The obvious disadvantage of this plan is that at no time in the history of a part number does the reference convey any idea of its uses. Against that

Drawing References.

may be said that at no time will the reference be inconsistent with its uses.

The least alteration in dimension destroys the validity of a part number, if the alteration prevents the altered part being used for repairs of the original part, and a new reference must be given to the varied design. This is sometimes felt to be rather a nuisance in the Drawing Office, but its necessity is very obvious from the production and stock point of view. When the variation consists only of a difference in material, every dimension remaining unaltered, the solution hardly lies in changing the reference number, though the danger of confusion, if the material difference is not obvious, may be so serious in its consequences as to fully justify a variation in reference number and the issue of a new drawing.

One scheme to get over the difficulty of changing numbers under such circumstances and to obviate confusion, is to effect some small difference in the machining such as an extra chamfer, or perhaps a slight groove on some turned surface, the difference being applied to the first change in material. This method only requires a note to be added to the original component drawing, with a letter symbol added to indicate the material in question. The principal instances of difference of material, without difference in dimensions, will be bolts and studs to which as it happens part numbers are not likely to be given.

In experimental work it is hardly feasible to treat part numbers as other than tentative—the design of the part being liable to any amount of alteration without necessitating a change of part number. Such part numbers may usefully be distinguished by prefixing the letter " E " on drawing and pattern.

A plan for identifying components adopted in some cases, is to take up a series of numbers each year, prefixing the year number —thus 13/2701 would be part number 2701 designed in 1913. This date reference is frequently very useful, particularly for stock control and stock valuation purposes. Another plan, and one quite widely adopted, is to number the components serially under the respective assembly drawing numbers—thus 4201/12 would be part number 12 on Drawing No. 4201. Immediately, however, this component figures on another assembly drawing the reference loses its special virtues and becomes rather a source of confusion.

The determining factor in the matter of part numbers is likely to be the facility for finding the drawing for each one when required. If the consideration of production efficiency results in unit drawings being issued for each component, then the obvious course will be to make the part number serve as the drawing number. In cases of certain details not conveniently drawn on separate sheets, the

Drawing References.

pieces may be distinguished by letters affixed to the one part number. Under these conditions drawings numbers as such, will only occur in connection with Assembly Drawings. Assembly Drawings may be general arrangements in the orthodox sense, or they may deal with assembly units only, and may be then described as partial general arrangement drawings. When the scheme of assembly units is adopted for regulating the work of fitting and erecting, the assembly unit drawing number has a very useful application for identifying the units as made up—in conjunction possibly with progressive numbers for each one made, though this may not be so good a scheme as using the order number with similar progressive numbers.

Provision has to be made under this scheme for variations in assembly units, not necessarily involving new drawings. Quite frequently the necessary amendments can be conveyed quite properly to the shops by a variation sheet attached to the Assembly 5·48. List. It will prove an excellent practice to give new references to altered assembly units. The style of reference numbers may very well be AU 1 and upwards.

It will probably be safer to have independent drawing references, apart from the AU reference, for assembly drawings generally, though these should be standard drawings of each nucleus assembly unit, which will be subject only to addition or deduction as may be laid down in subsequent Assembly Lists.

Every assembly drawing will require to make reference to a number of standard fittings, or what may be called "standard" fittings in contradistinction to components of special design. The following are typical of what is meant by standard fittings in the present connection :

Ball Bearings.
Bolts and Screws.
Keys.
Lubricators.
Pins, Cotter.
Pins, Taper.
Nuts.
Studs.
Washers.

Leaving for the moment the necessity for discretion in the direction of standardising these articles, it is certainly the case that some sizes of the various items of fittings can properly be standardised, and this being so, complete tables should be prepared and included as photo prints in each draughtsman's reference book. Some 5·39. style of symbol reference becomes necessary, and a series number S.F. 1 and up may be adopted with qualifying letters affixed to denote sizes as S.F. 1a.

There is no reason that standard fittings, as applied to design, should be limited by any suggestion in the above remarks, but rather it is to be expected that very considerable extensions can be made in many businesses, so as to include such details as bushes, etc., that ordinarily would be treated as components. Coming to

Drawing References.

the matter of exercising discretion over what to standardise in the way of fittings, the need for discretion is perhaps not so much as to actual standardisation, as to holding stocks of so-called standard items, that may only have a problematic use. Bolts, studs, and screws constitute a typical class in which the holding of wide ranges of stock is likely to be fraught with much risk of accumulating bad stock.

One theory in regard to standardisation is that larger quantities of any one item will be used and production costs reduced accordingly. This is sound only so long as the requirements prove to be large. With bolts, for instance, the requirements of design involve, rightly or wrongly, such a wide range of sizes, more of course as to lengths overall and lengths of screwing, that to standardise each variation becomes absurd, and to hold any beyond a very restricted range of stock sizes is likely to prove a bad speculation—not merely in involving spending money on useless stock, but in preventing the shops being free to make the sizes that are wanted. Such bolts or the like, therefore, that are outside the regular stock lines, require to be made only as and when required. A suitable system of reference for these specially made items will be to apply a serial number in conjunction with the Assembly Drawing No.—thus 1372/1, 1372/2. The provision of detail drawings, so imperative for items of this character, can be made quite inexpensively by adopting skeleton rubber stamps for each style of bolt, screw, stud, etc., and filling in the appropriate sizes on the rubber stamp endorsement. This endorsement may be put on the label or ticket used for ordering the articles, rather than as a separate sketch requiring to be separately looked after like an ordinary shop print.

Before leaving the subject of drawing references, a point may be made as to what is sometimes called "cost-marking." This usually means giving some cost symbol reference to each assembly drawing, so as to regulate the collection of sectional costs according to a pre-determined plan. The scheme is of considerable importance in attaining anything like a consistent grouping of costs. The group symbols are very useful also in the Drawing Office for classifying the assembly drawings.

Form of Drawings.

In dealing with the subject of drawings, the question of sizes of sheets used is apt to loom larger than it should on the score of filing facilities. The double elephant size (40″ by 27″) is the more commonly adopted standard of drawing paper. When original drawings are kept, the filing cabinets are made to correspond, and the tracings made from the drawings should comply with the same standard. There is, however, no reason that every original drawing should fill the sheet, or that one tracing sheet should not comprise several drawings. Standard subdivisions of the full sheet are, therefore, usually settled to ensure reasonable regularity in the size of the prints made from the tracings. **Form of Drawings.**

Rigid adherence to standard sizes of drawings is more reasonable when a blackboard is used for settling dimensions in full size, and when, in the case of assembly or arrangement drawings, dimensions may be largely omitted and cross references made by number symbols to the detail drawing of each component included, by other symbols to standard fittings listed in the Standardisation Book (issued to each draughtsman and to the foreman) and in the case of bolts and the like, not in the standard list and not separately detailed, as components, to a separate Bolt Sheet, or drawing of bolts, special to a particular assembly drawing.

Original drawings may with great advantage have only a temporary existence and be destroyed as soon as a tracing on cloth has been prepared and checked. There is a process of direct photography which saves tracing, but means the original drawing must be completed in every detail. In the large shipbuilding works the practice is fairly general for the draughtsman to make pencil drawings on thin inexpensive paper indicating all the requisite dimensions, title, etc., in a relatively rough way, and then for this drawing to be handed over to tracers to complete in proper style on tracing cloth. These tracers are commonly specially trained young women, and the results are very satisfactory and economical where there is the volume of work to warrant a separate department and a proper apprenticeship's course for the tracers. The tracings are returned to a leading draughtsman, known as a checker, to be checked, and he destroys the original drawing when the tracing is approved as correct. The tracings can be folded and placed in suitable envelopes for filing in a fireproof room.

All tracings should be jealously guarded, and prints only used in the Drawing Office for reference purposes. A very excellent method is for these prints to be bound up in book form for each variety of product. Plain books of this character are sometimes issued to the principal foremen, and will be found a great boon for shop reference purposes. The very bulk of the books tends to ensure their safe keeping. Uniformity in the size of prints may be more important for the purposes of these books than in any other connection.

In issuing prints to the shops some style of mount is necessary. 5-45. The following are amongst the styles in use :

On stiff mounts of millboard waterproof board (with or without tin binding) sheet iron, or three-ply wood.
On brown paper mounts folded to a convenient standard size.
On roll mounts, each stick for rolling purposes being made up of a pair of wooden strips of semicircular section, attached to each end of the print by screwing together.
Large prints on canvas back paper mounted on a light wooden frame.

Form of Drawings. Each method has its uses. Stiff mounts are the best for the smaller drawings for use at machines where suitable rests may be provided. Brown paper mounts are not unhandy for assembly drawings, if proper care is taken (the risk of drawings being stolen is perhaps increased), and lastly roll mounts in conjunction with linen backed printing paper are particularly handy for the larger general arrangement drawings.

The issue of prints from the Drawing Office must be most carefully registered if only to ensure, when alterations are necessary, that 5-44. every print is called in. Print Index Cards under each drawing number will be necessary, and the same cards can record prints sent away.

The custody of prints in the Works must be carefully looked after, 5-90. and all drawings as they are naturally called in the shops, though in reality prints, ought to be collected at the end of each week without exception. Where the range of shop drawings is extensive, yet without an excessive number being in use at one time, a simple and effective plan for tracing the whereabouts of the drawings is to have a large blackboard in the Shop Drawing Stores, and to have a series of cup hooks arranged on same to receive a tool check for each drawing issued, the drawing reference to be written in chalk above the hook. Red chalk can be used to distinguish assembly drawings.

5-46. In recalling prints from the Works a Print Recall Ticket may be used with advantage to serve as authority and receipt. A carbon duplicate can be clipped to the Print Index Card as a reminder of prints taken out of use. It is, of course, altogether detrimental to production for prints to be recalled until the job is finished. In the case of the Pattern Shop it may even be better to rule that no print once issued may be recalled. Once a drawing has been altered, a tabular statement of the alteration should be added to the drawing.

5-47. A list of drawings pertaining to each production order should be included with the Assembly Lists.

Specifications. There are various kinds of specifications that come within the purview of this book, though not all can be considered at any length.

There is the Sales Specification, on which a contract is based, as between the engineer or manufacturer and his customer. Its purpose is to control design not less than quality of materials and workmanship.

Then there is the Purchase Specification relating to purchases of materials effected by the engineer or manufacturer for the purposes of production.

Thirdly, there is the Working Specification, which is intended to control and assist the production, and calls for some discussion. **Specifications.**

The latter type of specification may resolve itself into a drawing and not infrequently stops short there. Under most conditions it will be necessary that there should be lists of parts collected in a suitable cover, apart from the drawing, though quite possibly the lists may be attached to the respective drawings as well.

With the use of lists separate from the drawing, there is a distinct advantage in restricting the functions of the drawing to that of furnishing dimensions, on the lines already discussed.

The primary functions that must be served by the separate lists will be to state the range and quantity of components required and the respective materials to be used. Such a list comprises something more than could be stated very well on the drawings themselves, as it constitutes a summary of all the components required for a given order.

Such a list may be termed a Part List, but if this Part List is so built up that there are distinct lists or sections of a list for each assembly unit—for that matter, for each assembly drawing—it will be more convenient to designate these classified or grouped lists as Assembly Lists. 5-48.

The aggregation of Assembly Lists to meet a given order may be 5-47. advantageously identified by a design index number. Under each index number it will be necessary to give a list of the particular assembly units involved, with their drawing references, and the drawing references of any general arrangements.

Touching the case of complete products that are varied in some relatively minor details, such as style of finish and accessories, to meet specific Sales Orders, there will not be any need usually to consider each such variation as one of design calling for a fresh design index number. It will be sufficient and more convenient to issue Erecting Cards specifying the assembly units (for it is to be 5-50. assumed that these conditions imply that much standardisation) and also stating the finish required, accessories to be fitted and so on. Separate cards would be necessary for each item of complete product, and these might be hung in metal cases near the work in process of erection. The progressive number of each item would be filled in on the cards ultimately, and by having the card used as the basis of final inspection, all essential records of goods supplied can be ensured for all time, without recourse to other documents or to memory.

Where assembly lists are at all standardised, standard lists can be issued for special orders with a "variation" sheet attached amending the list. This practice has, of course, its dangers, as may be said of most short cuts.

Specifications. A simple method of using the same basis lists, presumably photo prints, for different orders—with probably differing quantities—is to add written slips to the prints alongside the component descriptions, quoting the necessary particulars of order number, quantities and variation of material, if any, from that appearing in the basis list. This obviates the use of " variation " sheets and, if a little more work, is much safer.

In this matter of quantities required, the Assembly Lists may possibly only state the " number off " per set—leaving the arithmetic as to total quantities to be filled in by the Works through the medium of, say, the Works Office. In this case no extra slips need adding for each order, and any modification of the basis lists can be embodied in a " variation " sheet. When quantities vary per set for different orders, it will be safer to make a cancelling entry on the variation sheet of the item affected and make an entirely fresh entry for the modified quantities. In addition to the cancelling entry on this sheet, the original item in the basis list should be ruled through.

Where spare parts have to be supplied with the working parts, the make up of the total quantities requires more knowledge of the Sales Specification, and it may be safer for the Drawing Office to state the specific total quantities required.

5·53. A possible further function of an assembly list is, in addition to stating the total number of components required, to state the quantity of material necessary to make that number. As to castings, the material quantities are obvious, but in the case of what may be called " material from bulk," such as bar, sheet and tube, the quantities are not at all obvious. In the case of forgings and stampings, it is very doubtful if the computation of material quantities can be done to any advantage outside the Smithy. It may be assumed that smithy material purchases are based on estimates by the Smithy foreman, subject to the qualifications of the Estimator to obviate the need for referring to the foreman. In any case these quantities need not be considered as likely to be attempted in the Drawing Office.

In regard to material from bulk, there is no reason why the Drawing Office should not have enough touch with machining requirements to specify the appropriate quantities with fair accuracy. The primary objection to this course is likely to arise from the liability to delay in the issuing of Assembly Lists if the Drawing Office shall attempt to provide this information all cut and dried. The view is held by some that the Machine Shop foreman should requisition the material he requires.

Where production efficiency is seriously attempted, the aim of the Works Office will be to get all material purchased and delivered into the General Stores against the time when the shops are due to start work on same, without necessarily requiring the assistance of the respective foremen before reaching this stage. If purchasing is done on a generous enough scale, there will be no need to investigate quantities required very closely, and, following from such a practice, there will be no means of controlling in any way the consumption of material, and loss will probably occur through excess buying. **Specifications.**

The idea of computing in advance the quantities required has been applied to effectively economise in regard to material used on works additions and repairs. The scope for economy in connection with production orders may not be so obvious, but undoubtedly it does exist, and in view of the large turnover of material, a small percentage of saving must amply repay for the initial trouble of stating what ought to be required and to see that no more is issued, except to replace defective work under proper authority.

Practice differs in regard to the inclusion of what have been called standard fittings in the Assembly Lists. It may seem an ultra-refinement to specify every nut, washer and cotter pin, but it must be borne in mind that the right quantities have to be learnt at some stage of production for issuing the details to the fitters and erectors. Alternatively, of course, the foreman may draw out these fittings in any quantity he thinks fit, and there is then no sort of check possible to prevent serious wastage by the men. Economy of material may, of course, be obtained sometimes at the expense of output, and some little discretion will be necessary in allowing the replacement of lost items without undue formalities. If the proper atmosphere of carefulness is established, there will be an appreciable margin of resultant saving in hand to justify casual losses being made up on little more than the word of the men, so long as a note is made against the man's check number to prevent abuse. Under such conditions only the correct quantities, as given on the Assembly List, ought to be drawn in the first instance for assembling purposes.

What amounts to a form of assembly list is occasioned in some businesses in connection with Sales Sundries Orders. These may be designated Sales Sundries Order Specifications, and can be made 5-51. to greatly facilitate the putting of such orders in hand. The necessity for specification arises particularly when designs have changed and exceptional care is requisite to ensure the correct interpretation of the customer's order. For this reason, the preparation of these specifications can hardly be done outside the Drawing Office.

Specifications. A point of considerable importance in obviating these troubles of interpretation of customers' requirements is to make the type reference and progressive number very plain on the name-plate affixed to the original complete product, and to add a request in bold letters, "Always quote Type and No." in communication. The position of the name-plate should obviously be prominent.

Patterns. Coming to the matter of patterns, as an administrative problem the question is almost wholly that of the organisation of the Pattern Stores.

The Pattern Shop foreman frequently divides the responsibilities pertaining to the Pattern Stores with the attendant, but this still leaves the matter one of Pattern Stores organisation.

A good many pattern stores are run on the basis of memory, and the possibilities of a good memory in this connection are really wonderful, making the establishment of an equivalent organisation appear cumbrous and expensive. There are considerable risks attaching to a pure memory system very much as there are risks in not insuring against fire. In the latter case, it is generally held that the risk is too serious to be taken without the precaution of insurance, and the expense of an annual premium is therefore admitted without demur. In the case of patterns, if the attendant with the memory is missing, the whole system is missing, and the consequences to production of even one day's absence of this man can easily be very serious. The multitude and infinite variety of patterns possessed by most works makes the organisation of the Pattern Stores a difficult matter, more particularly when the space available is comparatively very restricted, as it usually is. If the lines of production are stable and the designs are distinctive right through without patterns being common to more than one design, it will be possible—given the requisite space—to keep each group of patterns separate in such a way as to obviate the need for registering the location of any pattern to enable it to be readily found when wanted.

There is the other side of the problem which no conditions will simplify out of existence, namely, the necessity to know the whereabouts of a pattern that is not in its place in the Pattern Stores.

The principle of having a specific place for each pattern is admitted generally, but unless the conditions allow of a very orderly and undisturbed lay-out of patterns as stored, it is likely to be difficult for any attendant to be sure of never varying the place in which a given pattern is stored.

There is, of course, no difficulty in adopting a suitable scheme of location reference, such as the various stacks and tiers of shelving being lettered A, B, C, etc., as to whether referring to the floor under the shelving, the lowest shelf, the second shelf, and so on. Each bay or block can be numbered as erected, and a reference such as 1 B will then mean, lowest shelf of block B. **Patterns.**

With location references available, there must be some register or record whereby the attendant can register the location decided on for each pattern, and where he, or anyone else, can afterwards refer for learning the appointed location. Such a register can with considerable advantage be made to include the drawing reference and a record of the core boxes, and extra pieces pertaining to each pattern, also as to any strickle boards, or setting out boards. It will also be of service to record whether the pattern is in metal or wood, and also if the pattern is a multiple pattern, that is, if from one moulding more than one casting, from the component point of view, will result. Bush patterns for instance, may be made in lengths suitable for making several bushes from one piece as cast.

Another function of this register, which may be called a Pattern Mark Register, is to supply numbers for use as pattern marks, that 5-66. is to say, when a new pattern is made for which a pattern mark is required, an entry will be made in this Pattern Mark Register against the next consecutive number. The location reference will be filled in later, when the pattern is ready for use, with the date of completion of pattern. If, as may reasonably be supposed, all patterns bearing pattern marks, as distinct from component or part numbers, are liable to be altered in some way, then the nature and purpose of any such alterations should also be noted in the register above mentioned. This tabulation of alterations is just where sins of omission are most likely to occur. The importance of such tabulations depends entirely on the use to which the complete records are put, but in almost all cases there will be some liability for information as to the existing application of any pattern to be required at short notice, usually with a view to some repeat order for castings being filled.

In some businesses the variation of product is so interminable that a good many patterns may be of the roughest description, possibly not warranting even a pattern mark, still less any record of alterations. Under such circumstances the patterns are at best only temporary ones, and the memories of the Pattern Stores attendant, and the Pattern Shop foreman must jointly be sufficient for all purposes during the life of such patterns.

In the matter of pattern marks, where there is no part number given on the drawing, then the Pattern Shop foreman from his Pattern Mark Register will take up a number reference, which he will need to mark on his drawing, if all possible confusion on the

Patterns. score of reference by names is to be avoided. This means that the prints issued to the Pattern Shop will either have to be retained there, or the information as to pattern marks adopted conveyed to the Drawing Office for inclusion on the tracing. It is, of course, all to the good that the Drawing Office should know these pattern marks, though it is probably sounder practice for them to always use drawing numbers for cross reference, when any design is founded on a previous one and allows the original pattern to be utilised. A reference in the later drawing, to the effect that an existing pattern, as made to a certain drawing, is to be used with modifications A, B, C, etc., will achieve as much as quoting the pattern mark. The plain indication as to any differing dimensions will save much time in the Pattern Shop and obviate mistakes.

Coming to the consideration of part numbers in relation to Patterns, it is obviously a boon to have part numbers appearing on the respective castings in raised figures. This means applying raised figures to the pattern, and a very convenient and cheap means is to use aluminium strips embossed with the requisite figures, by means of a name-plate embossing machine, such as have been placed on the market as slot machines, which can be installed in the Pattern Shop.

Obviously if a given pattern is to make a certain numbered part, and that only, then there is no reason to have any pattern mark
5-66. other than the part number. A separate Part Number Pattern Register will then, however, be necessary, and if the part numbering scheme adopted consists of joint consecutive number and year number, the pattern mark scheme previously discussed can be consecutive numbers only without risk of confusion with part numbers.

It may be remarked that, ordinarily, pattern marks are not made so as to be reproduced on the casting, being merely stamped in the wood of the pattern. The difficulty that arises over the use of part numbers, in lieu of pattern marks, is occasioned by the use of one pattern to produce castings for different applications. A common case is that of right hand and left hand applications of the same castings, the machining being, however, different and necessitating distinct part number references for the finished components, or it may be that a loose piece has alternative positions on the pattern according to the part required. Other cases occur when an alteration of dimensions in the finished component does not affect the pattern but changes the part number. The difficulty is not satisfactorily avoided by adopting an arbitrary pattern mark, having no reference to any application of the casting to make parts bearing different numbers. Such a pattern mark has the negative virtue of not

Patterns.

misleading, but does not help to identify the casting, or rather the possible use of the castings.

A convenient method of overcoming the main difficulties will be, firstly, to retain the part number in lieu of a pattern mark, so as not to break away from the general scheme, and secondly, when any pattern becomes applicable to more than one part number, to prefix the original part number, as fixed on the pattern, with a symbol X. This would mean that if X 13/2071 appeared on a casting every one would know that such casting would make parts numbered 13/2071, and also some other parts bearing different numbers. It might be expedient to have the part numbers for the alternative applications added to the pattern, using the original one for reference purposes. It is certainly important that castings having alternative applications should bear some clear evidence of the fact in all stages of production.

When, however, for purposes of economy an existing pattern for producing one component is temporarily altered so as to serve for a different component, and while in its altered form, will not serve its original purpose, then the original part number requires to be blocked out by covering the number plate with a blank cap of suitable shape, and temporarily adding the appropriate part number for the modified pattern.

Assuming the existence of Pattern Mark and Part Number Pattern Registers giving the location reference for each pattern, further, and preferably independent, records are necessary to show the whereabouts of a pattern when sent away from the Pattern Stores.

The importance of this information is greatest when patterns are sent to outside foundries, and particularly so when the orders for castings are distributed between several outside foundries or between outside foundries and the Works Foundry.

If Pattern Tracing Cards are adopted for each of these patterns, 5-67. the cards can be so arranged as to show graphically what patterns are away, and where they are. The fact of the patterns being away can be made plain by standing the card on end in its proper sequence of pattern mark, or part number, and applying a coloured metal signal to show what foundry; cards without signals but turned on one end indicating, say, the Works Foundry.

To maintain this tracing scheme, it is necessary for the Pattern Store attendant to enter up the patterns sent out, and the patterns returned. The entries of patterns sent to foundry can be associated with the instruction to the Foundry to make castings. A Casting 5-69. Instruction Sheet can be arranged for carbon duplicate to meet these requirements.

As to patterns returned to the Pattern Stores, the Foundry

Patterns. foreman might conceivably make out a note in duplicate, showing the patterns returned. Alternatively the Pattern Stores attendant 5-83. could make out a Goods Acknowledgment Form, or its equivalent, for the patterns received back.

Under most conditions it will be the better practice for patterns to be returned from the Foundry, on completion of the casting order, rather than to allow patterns to remain at the Foundry, to be possibly mislaid or ill-used. Conceivably with certain patterns from which castings are being ordered at frequent intervals, the return of the patterns after each order might be inadvisable. The same may be said of all metal patterns, and patterns mounted on plates, for use in moulding machines, as the form of the pattern is presumptive evidence of frequent use.

It may be taken as essential to efficient foundry service, that all patterns that are finished with for the moment, shall be put in a proper place out of harm's way, and that patterns waiting to be put into use should be located at one suitably equipped place, within or close to the Foundry—thus leaving about the Foundry only those patterns actually being used. Under these conditions, the discretion as to return of patterns on completion of order can be more readily exercised, while the finding of any pattern not yet returned from the Foundry will be facilitated.

When patterns are specifically recalled from the Foundry during the progress of an order, it is certainly desirable to make the recall in a regular manner in writing under proper authority. Such 5-70. recalls should be notified by means, say, of carbon copies of a Pattern Recall Slip, to the Works Office and to the Foundry. These cross communications as to change in plans are vital to efficient co-ordination.

Writing with chalk on the pattern is frequently made to serve as a casting order. A better alternative altogether is to fill in small adhesive labels, with the necessary instructions in ink, and stick the labels on the respective patterns. This does not inform the Foundry foreman adequately of work coming in, because he may not personally see the pattern at the time—though depositing all patterns at one spot will greatly help matters. Then again the delivery requirements must be continually under the foreman's notice apart from the pattern. To this end it will be better to have the Casting Instruction, in a form suitable for conveying all the necessary information as to quantities, metal and delivery requirements. The Pattern Shop may be supposed to derive the necessary information from Quantity Slips supplied by the Works Office.

It is appropriate to this discussion on patterns, to mention the necessity for the General Stores to index the Casting Instructions they receive, so that if a pattern mark or part number crops up through recall of pattern or other cause, they may know on what order the castings are being made. **Patterns.**

This index may be readily prepared on squared Cross Index Sheets, numbered 0-9 across and 00-90 down the sheet, making one hundred squares on each sheet. This Cross Index Sheet is very useful, 5-68. whenever castings are delivered under incorrect instruction numbers and for reference to earlier applications of any pattern.

Materials.

Section III d

Purchase Specifications.

QUITE usually material specifications are set out in the firm's catalogue of products, but such specifications are not likely to be in such a form as to serve adequately for purchasing purposes. In other cases where contracts for special products are entered into there will be material specifications embodied in the contract sufficient to control the purchasing, but even these will require converting in some measure into terms directly applicable to the contractor's own method of purchasing.

This question of the purchase specification is enlarged upon as its proper appreciation is vital to efficiency in material purchases. The preparation of these specifications calls for the most expert technical knowledge available, and the work of the Drawing Office in this direction may very reasonably be subjected to review by the Works Manager, and by the Estimator apart from the Buyer, who ought to be qualified to know how these very definite specifications are likely to affect purchase prices.

Purchase specifications should be settled for every class of material purchased. The responsibilities as to the purchase specifications for process supplies (Foundry Iron, etc.) may be vested in a Works Chemist, and for shop supplies (Files, Oil, Fuel, etc.) in the Works Manager personally. When there is a Works Chemist, he may conceivably be a party to the wording of all purchase specifications.

The definite setting out of purchase specifications implies an adequate inspection of the goods supplied to those specifications. In both directions, most valuable functions may be served by a Works Laboratory.

It is a very common practice to shirk both the initial specification and the inspection of the goods received, trusting to the supplier entirely, which probably means buying very inefficiently.

Efficiency in materials involves both purchase cost and working cost together with physical suitability for the intended purpose.

Purchase Specifications. Thus with a casting, the cost of machining ought to be associated with the cost of the rough casting, when comparing low priced with high priced castings for the advantage as to ultimate cost may easily lie with the latter. The alternative use of stampings, in lieu of castings or forgings, or, it may be, of solid bar, is all within the scope of material efficiency. In the latter connection, the amount of material wasted must not be overlooked.

The physical properties of expensive materials may by virtue of weight saved in accomplishing a given result, make high priced material the more efficient. In another case a less expensive material in greater bulk may be the better solution.

Price per unit of quantity is no criterion of value unless the purchase specification be quite clear.

These specifications will have to allow appropriate margin or limits that will ensure the right goods being obtained. The right goods will not necessarily mean the best possible quality goods, for there may be no occasion to have such. A typical case is that of fuel, when the most efficient methods of stoking and combustion are employed, as in such a case possibly very inferior and therefore very cheap fuel may be employed with entirely satisfactory results as to steam-raising.

Some of the elements entering into standard purchase specifications may be instanced as follows:

Strength of Materials.

Mechanical tests.
Constituent parts of alloys.
Chemical tests.

Limits of Error in Dimensions.

Dimensions on shafts and holes for running, driving and shrink fits.
Dimensions of rolled or drawn bar.
Dimensions of screws, external and internal.
Pitch diameter of cast gears.

In many instances a detailed specification would be unnecessary and perhaps useless, and in such cases a correctly drawn up trade description can be adopted to advantage. It must be borne in mind that descriptions commonly accepted in a given trade, as for instance brush manufacturers, are not commonly known outside that trade, so that there may be room for a good deal of investigation even when it is intended to adopt a trade description.

All standard purchase specifications will require to be numbered for reference, and copies may very well be kept on hand for attachment to purchase orders. A note may be usefully added to same that

"Our own inspection is carried out strictly to this specification."

Purchase Requisitions. In the matter of purchase requisitions these will quite usually embody the purchase specifications so far as anything of the sort

Purchase Requisitions.

is attempted, though when the latter have been adequately developed this embodiment will involve no more, in the majority of cases, than a cross reference to a standard specification.

Standardisation in materials is largely a matter of designing policy, and its bearing on efficiency in purchasing, stock control and production may be considerable.

Under most conditions materials, as purchased, will fall under two main headings, viz. special materials and ordinary stock materials.

Consideration of the matter is simplified by separating castings, stampings, forgings and the like under the distinctive heading of "process products"—a term designed to apply to such items when made in the Works, but quite applicable to purchases.

In the matter of special materials the distinction will lie more often in the special application or appropriation of the material than in its special nature. Quite conceivably in some businesses ordinary stock materials might include some quite exceptional kinds of material.

From an accounting point of view material bought specially for any order should be allocated straight away to that order.

Material allocation, it may be remarked here, means the charging out of material to a specific order while the setting aside or earmarking of material for a particular order is better referred to as material appropriation.

From the stock control point of view, it is simpler to requisition materials of all kinds to suit each order as it comes along, and to appropriate such material for this purpose whenever it shall be received, rather than to maintain such a stock as shall meet all requirements.

With mass production conditions, or anything approaching thereto, there is perhaps a gain in maintaining large stocks of material though even then there will be economy in purchasing to suit each stock manufacturing sanction, or estimated requirements for a given period.

The locking up of capital in stock will, apart from questions of buying ahead in a favourable market, be justified according as production is facilitated by material being always available; for to have material ready when wanted is a vital condition of production efficiency. It is very doubtful if this should be effected by holding large stocks, but rather that the organisation should be such as to ensure the proper material being requisitioned, purchased and delivered in good time.

There is another consideration to be kept in view, namely the prompt replacement of defective material and provision for meeting other emergencies, such as customers' demands for replace parts.

Purchase Requisitions.

The best compromise seems to be to first aim at standardisation of material and then to hold reserve stocks in these standard lines just to meet emergencies. After that as each order, whether for special or standard product, is put in hand steps must be taken immediately to obtain appropriate supplies of material.

It will usually be found the better course for the Works Office to extend the Assembly List into a list of quantities for each order by means of attached slips, as previously mentioned, and prepare purchase requisitions with schedules of delivery dates necessary to meet production programmes.

These requisitions can be supplemented by the quantity necessary to provide a reserve stock to meet emergencies of replacements and spare parts in accordance with the dictates of experience and the balance already available in the General Stores.

When the Drawing Office prepare the purchase requisition, as will be most likely desirable in certain cases of auxiliary equipment bought out finished, a Quantity Slip can be attached to the Assembly List and marked accordingly, to obviate confusion.

The naming of delivery dates on each purchase requisition is very important in regard to making it possible for the General Stores to get material delivered in accordance with production requirements without periodic panics, but considerable knowledge and judgment is necessary for specifying the dates with even a moderate accuracy.

Having gone to the trouble of planning the dates for delivery, the importance of adhering to these dates must be impressed on the supplier.

Purchase requisitions will be also necessary for those materials that do not concern the Drawing Office or even the Works Office, and these will usually be best dealt with as to process supplies and shop supplies by the General Stores, as to tools by the Tool Stores, and as to plant other than tools by, say, the Works Manager through his clerk.

5·54. The approval of all purchase requisitions is usually vested in the Works Manager, and this is a right course so long as this authorisation is understood to be made to an extent on limited information and that effective control of expenditure is separately provided for by the routine organisation.

Obviously this control ought to be exercised at the requisition stage rather than attempted when passing the purchase orders necessary for executing the requisition.

Another point to be provided for in the requisition stage is that there shall be no overlapping of requisitions for the same goods. Purchase requisitions need, therefore, to be reviewed by the General

Purchase Requisitions. Stores, though under proper administration and organisation the risk of overlapping may be so small as to be left out of the routine of purchasing, that is, the purchase requisition may pass direct from the Production Office to the Works Manager and thence to the Buyer. A carbon copy of each requisition can be passed to the General Stores for them to review as to overlapping (reporting accordingly without delay), and for holding against the arrival of a copy of the Purchase Order. The General Stores becomes then in a position to look out for purchase orders not being held up unduly, having regard to the delivery requirements specified on the requisition.

When buying is done directly under the Works Manager, it may be advantageous to locate the Buyer within the Works Office. It may be feasible then for the Buyer to proceed with his price enquiries while the purchase requisition is in process of authorisation by the Works Manager.

Purchasing. Reference has previously been made to the functions of a Buyer, and incidentally to the conditions for efficient purchasing.

Apart from the personal qualifications of the Buyer, there must be preparatory work done before he comes into the matter.

Promptitude in the preparation of purchase requisitions and the inclusion on same of delivery requirements will enable the Buyer to know how far he may go in the sending out of Price Enquiries. 5-14.
A date for sending in quotations should be stated on each enquiry.

Any quotations obtained by the Estimator for the making up of tenders, that are ultimately accepted, should be placed at the disposal of the Buyer.

It will be usually left to the Supplier to make offers as to delivery, and this must influence the Buyer's selection of the most favourable quotation. Where the delivery offered at the lowest price is not within the requirements of the purchase requisition, it is advisable to negotiate on this point before placing the purchase order so that there may be the less fear of difficulty in obtaining the right delivery.

The selection of the most favourable quotation is not necessarily a question of price or delivery, as reliability or suitability of the goods quoted for is hardly less important than delivery, and may be more important than price.

These several factors tend to the placing of purchase orders of a 5-15.
given kind in relatively few directions unless the quantities involved in the course of a year are large enough to allow further partition of the orders without reducing the value of the business to any supplier below the point at which it is likely to command adequate attention.

No buyer can afford to be absolutely positive that his firm is buying in the best market, and to that end it is his business to give

Purchasing.

a fair hearing to all who may reasonably be supposed to be in a position to supply the firm's requirements.

Really competitive quotations can only be obtained when business is distributed in some degree at least.

The practice of playing off one competitor against another by disclosing competitive prices, whether partially or wholly, is hardly straightforward, to say the least, and it is very doubtful if the cut obtained in prices by these underhand means is really the smart buying it is vaunted to be, if delivery, quality and future relations are duly taken into account. In certain materials, rings to fix prices have been formed among the manufacturers, and prices can usually only be varied for large contracts—this liberty being sometimes reserved by the members of the ring.

Another aspect of buying is the placing of contracts for supplies over a given period. Such contracts may prove distinctly economical for regular supplies of every character where otherwise the individual orders might be too small to command the best terms. Another class of useful contracts will be for finished products that have to be bought outside, though in this direction minimum quantities may have to be guaranteed to get any marked advantage in price, and this is not always a safe undertaking unless designs are thoroughly established.

The form of the Contract Note will depend on the nature of the business, but the following example will suggest the character of the provisions to be embodied for purchasing in the ordinary way as distinct from elaborate undertakings.

Where the undertakings are on a large scale, there may be a further development necessary in the form of contract by having a third party to the contract, namely "The Sureties," to meet the obligations falling on the Contractor should he fail to do so.

CONTRACT NOTE.

W. Blank & Co. Ltd., Efficiency Works, Main Road, London (hereinafter called the Buyers), and..(hereinafter called the Sellers), at the prices and subject to the conditions hereinafter contained. The said conditions form an essential part of the contract and are agreed to by the Sellers in consideration of the order.

CONDITIONS.

Period of Contract.	This Contract No..............................To date from........................ 19.........to....................................19......
Description.	....
Quality.	The said articles shall be in materials, workmanship and in every other respect equal and answerable to the standard samples deposited at the Buyers' Offices, and in case the Buyers shall at any time be of opinion that any of the said articles delivered are not equal in quality and all other respects to the articles intended by this Contract, it shall be lawful for the Buyers to reject the same as defective.
Quantity.	....

Increased Quantity. The Buyers have the right to take an increased number of the articles described over and above the foregoing quantity specified up to a maximum of .... such excess deliveries to be subject in all respects to the terms described herein.

Price. ....

Delivery. The said articles shall be delivered by the Sellers at such place or places in London and at such time or times as shall be specified in the order or orders given from time to time by the Buyers, and in such quantities as shall from time to time be required by the Buyers and free from all charges for packing, carriage, delivery or otherwise whatever. Packages to be returnable.

Terms of Payment. Subject to 3¾ per cent. for cash in seven days from the date of delivery, or 2½ per cent. on payment during the month following delivery.

Defective Articles. The Buyers may exercise the option of deducting all defective articles from the quantity contracted for, and to debit the Sellers with the original value of the articles. Or, they may require the whole of the articles replaced within......................days, from the receipt of such defective articles by the Sellers, and debit them with all expenses (carriage) incurred. The Buyers furthermore reserve to themselves the right, should supplies of defective material be general, to cancel the whole or any portion of the Contract.

Stoppages. In the event of stoppage of work owing to fire, tempest, breakdown, or accidents, trade disputes, lock-outs, strikes, or other combinations of workmen, or any other unforeseen occurrence beyond the Sellers' control, deliveries may be wholly or partially suspended until work is resumed under normal conditions.

Notice and proof of such unforeseen occurrence to be given by the Sellers in writing within three days of such stoppage, and the period of the stoppage of the Sellers' works from any of the above causes to be added to the contract period of delivery.

But the Buyers have the option to cancel at their own discretion that portion of the deliveries so delayed instead of accepting postponed deliveries.

Liquidated Damages for late and Non-Delivery. The Buyers reserve the right to deduct as liquidated damages.................. per cent. of the value in respect of all articles not delivered as per official orders for every..................days delay or part thereof after the.............. day following the date of the orders, and such amount may be deducted from next payment due.

New Tools. Whenever new tools are used, samples to be made and submitted to the Buyers for their approval, and no more articles are to be made from these new tools until the samples have been approved in writing by the Buyers.

Dated this.................................day of.....................19

(Signature)...

Examples of possible further clauses may be quoted by way of suggestion.

The Sellers in carrying out this Contract shall pay the rate of wages and observe the hours of labour recognised or agreed upon between the Trades Unions and the Employers in the locality in which the work for carrying out the Contract is to be completed, and the Sellers shall not transfer, assign or underlet directly or indirectly this Contract or any part share or interest therein without the written consent is given of the Buyers, and that in case such consent is given the Sellers shall be responsible for all work done by any such sub-contractor and for its being carried out under the same conditions as if executed by the Sellers.

The Buyers shall have the option of paying by bills and when this option is exercised, the charges incurred in connection with the discounting of the bills shall be borne by the Buyers.

In the event of the Buyers failing to pay any of the accounts as agreed, or becoming bankrupt, or committing an act of bankruptcy, the Sellers without prejudice to any claim they may have for damages shall have the right to suspend delivery hereunder, and to cancel this Contract, without giving rise to any claim for compensation on the part of the Buyers.

The Buyers have the right to cancel this Contract at any time in the event of the Sellers, or any agent or official of the Sellers, giving or offering to give, any present, or conferring a benefit of any kind on any official connected with the Sellers, as an inducement to obtain any order from the Buyers, or as a reward for having obtained, or being instrumental in obtaining, an order.

In this matter of secret commission, the Prevention of Corruption Act, 1906, provides for certain penalties under the law—the maximum penalty being imprisonment with hard labour for two years, coupled with a fine of £500. It may be considered desirable to display a notice for the Staff to the effect that anyone giving or

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receiving commissions or presents, unless with the knowledge and consent of the Directors, will be liable to proceeding under the Act.

Quite frequently there will be a convenience in issuing petty purchase orders under a lesser authority than that necessary for ordinary purchase orders. In this case a limit of say £1 may be indicated on the order form and plain instructions given on same to the supplier to refer back, if the value of goods ordered exceeds this amount. In some instances, all orders above £50 in value have to be signed by the Managing Director.

Sale of Goods Act.

By way of reminder of some of the conditions attaching to buying, and therefore to selling, some extracts are given below from the Act dealing with the subject.

Extracts from the Sale of Goods Act, 1893.

Where there is a contract for the sale of goods by description, there is an implied condition that the goods shall correspond with the description; and if the sale be by sample, as well as by description, it is not sufficient that the bulk of the goods corresponds with the sample if the goods do not also correspond with the description.

Subject to the provisions of this Act and of any statute in that behalf, there is no implied warranty or condition as to the quality or fitness for any particular purpose of goods supplied under a contract of sale, except as follows:

(1) Where the buyer, expressly or by implication, makes known to the seller the particular purpose for which the goods are required, so as to show that the buyer relies on the seller's skill or judgment, and the goods are of a description which it is in the course of the seller's business to supply (whether he be the manufacturer or not), there is an implied condition that the goods shall be reasonably fit for such purpose, provided that in the case of a contract for the sale of a specified article under its patent or other trade name, there is no implied condition as to its fitness for any particular purpose:

(2) Where goods are bought by description from a seller who deals in goods of that description (whether he be the manufacturer or not), there is an implied condition that the goods shall be of merchantable quality; provided that if the buyer has examined the goods, there shall be no implied condition as regards defects which such examination ought to have revealed:

(3) An implied warranty or condition as to quality or fitness for a particular purpose may be annexed by the usage of trade:

(4) An express warranty or condition does not negative a warranty or condition implied by this Act unless inconsistent therewith.

Where, in pursuance of a contract of sale, the seller is authorised or required to send the goods to the buyer, delivery of the goods to a carrier, whether named by the buyer or not, for the purpose of transmission to the buyer is *prima facie* deemed to be a delivery of the goods to the buyer.

Unless otherwise authorised by the buyer, the seller must make such contract with the carrier on behalf of the buyer as may be reasonable having regard to the nature of the goods and the other circumstances of the case. If the seller omit so to do, and the goods are lost or damaged in course of transit, the buyer may decline to treat the delivery to the carrier as a delivery to himself, or may hold the seller responsible in damages.

Unless otherwise agreed, where goods are sent by the seller to the buyer by a route involving sea transit, under circumstances in which it is usual to insure, the seller must give such notice to the buyer as may enable him to insure them during their sea transit, and, if the seller fails to do so, the goods shall be deemed to be at his risk during such sea transit.

Where goods are delivered to the buyer, which he has not previously examined, he is not deemed to have accepted them unless and until he has had a reasonable opportunity of examining them for the purpose of ascertaining whether they are in conformity with the contract.

Unless otherwise agreed, when the seller tenders delivery of goods to the buyer, he is bound, on request, to afford the buyer a reasonable opportunity of examining the goods for the purpose of ascertaining whether they are in conformity with the contract.

The buyer is deemed to have accepted the goods when he intimates to the seller that he has accepted them, or when the goods have been delivered to him, and he does any act in relation to them which is inconsistent with the ownership of the seller, or when after the lapse of a reasonable time, he retains the goods without intimating to the seller that he has rejected them.

Unless otherwise agreed, where goods are delivered to the buyer, and he refuses to accept them, having the right so to do, he is not bound to return them to the seller, but it is sufficient if he intimates to the seller that he refuses to accept them.

Where any right, duty, or liability would arise under a contract of sale by implication of law, it may be negatived or varied by express agreement or by the course of dealing between the parties, or by usage, if the usage be such as to bind both parties to the contract.

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After the purchase orders have been placed the question of following up deliveries arises, as it is not always sufficient to merely specify to the supplier the dates on which delivery is required.

Explicit but reasonable instructions as to delivery at the time of placing the order constitutes the necessary preliminary to getting deliveries when required.

The next stage is to send a reminder to the supplier, possibly 5-80. in the form of a postcard, a few days, varying according to the class of order, before the date on which delivery is expected. Orders for stock articles, if in stock, will have been filled before any question of reminder arises.

When the delivery or due date arrives, and after allowing a small margin for the goods or the advice to come to hand, a statement should be sent forthwith of quantities overdue, and these statements should be continued weekly with amendments as to further deliveries falling due and as to goods actually received. This routine may have to be supplemented by letters, telegrams 5-81. and the usual means adopted for impressing the supplier with the importance of delivery. The General Stores should deal with the urging of materials from start to finish, the Works Manager signing all correspondence.

Under some circumstances it will pay to send out a special representative to call on the suppliers with whom orders have been placed. In adopting this plan, however rarely, the representative should insist on being shown the work in progress, and should be technical enough to appreciate the prospects of delivery promises being kept.

The routine of reminder cards and weekly statements of deliveries overdue supplemented with correspondence will be found much more effective than sending formal urging forms, which are sent out too generally to be taken very seriously—lurid colours of paper notwithstanding.

In the matter of weekly statements of deliveries overdue, these may conveniently be extended to serve as reminders of deliveries falling due, where running lines are involved.

In laying down a plan of deliveries of material required, and getting the supplier to live up to it, an objection may be urged to the increased administrative expense involved, for work of this character requires intelligent and continuous application.

The justification must lie in the increased production efficiency attained by these means. The fact that in some cases, the placing of a purchase order with a hackneyed formula as to delivery "soon as possible," or it may be "urgent" (some firms even issue a separate series of purchase orders designated as Urgent Orders), brings the

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goods in sufficiently early does not discount the necessity for taking no chances in the matter.

Every failure in the supply of material at the right moment, or even before the right moment as regards being actually put into work, means a loss of output far outweighing the expense of preventing its occurrence, as can so largely be done.

When goods are received various questions of routine arise, of which the primary ones are the collection of the goods, the checking and inspection, handing over to or advising of department interested in the receipt, and reporting the receipt for accounting purposes.

The collection of goods is not a factor arising in many works, as delivery by the railway companies to the works is likely to be cheaper.

When collection from the railway stations is undertaken, proper records of goods collected must be kept for the purpose of obtaining rebate from the railway company concerned. The danger of careless signature by the collecting carman must be guarded against, and it will be advisable for each day's signatures at the station to be checked by the Receiving Clerk against the collection sheets every two days at least.

The necessity for inspection, except of a superficial character, is not always recognised, and goods are frequently passed into stock on the reputation of the supplier, and not always even with that support. Some items such as wood screws will hardly require much inspection, and being duly packeted in small cartons any fault discovered in using the screws could be fairly easily proved at a later date. Other items that are supplied loose and possibly obtained from various sources are not merely difficult to identify afterwards, but the fault when discovered might seriously dislocate production in some direction. Instances of this sort will be bolts and nuts, which are not always produced within the limits requisite for interchangeability—whether coarse or fine limits, the limits exist and must be recognised. Adequate viewing or gauging on receipt is the only right course to adopt, and this ought not to involve excessive work. The list given elsewhere of standard fittings will suggest many other items requiring viewing as to dimensions.

Some items, such as castings, require a surface examination by a skilled observer, as distinct from viewing, but this ought to be much more than the merely superficial examination usually sufficient for accounting purposes.

The necessity for physical and chemical tests from test bars of materials purchased are most frequently determined by the requirements of the inspector acting for the customer. These tests do not, however, constitute as reliable an index of strength and suitability

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of the material when worked up as is sometimes supposed. The more trustworthy though more expensive method may be to select a completely formed component and test it as nearly as possible as it would be tested in actual work.

Where the volume and character of purchases justify it, the practice of having an inspector or viewer working in the General Stores may prove more expeditious than referring the items concerned to the View Room proper, but with a competent Receiving Clerk qualified to deal with many of the supplies, the latter course is likely to be the more economical.

Whatever the arrangements for inspection it is very desirable that every receipt of goods be inspected by somebody of competence, though not necessarily by any one official, as his qualifications can rarely range over the whole ground. Fuel, for instance, will require a very different experience to that necessary for bolts and nuts, and timber different again from both.

The form of the report or certificate of goods received is important only so far as it allows the requisite elasticity in the inspection routine and meets the convenience of the office routine for passing of invoices.

These requirements make for the use of a separate sheet or card
for each receipt. These Goods Received Notes should be numbered 5·32.
serially using a prefix such as " G. R." to distinguish the series from
invoice and other commercial references.

Each note will require to be certified by the Receiving Clerk as to quantities, weights and descriptions, and then passed as to inspection by a suitable authority. A carbon copy of each note may very well be retained at the General Stores.

The Receiving Clerk will have to mark off each receipt on the stores copy of the purchase order concerned—these copies being held under supplier's names rather than under separate purchase order numbers, lest same be not quoted on the supplier's advice note or marked on the package containing the goods.

Insistence on the suppliers sending advice notes for each consignment, apart from the invoice, is very important for following up delays in transit promptly and in proving differences.

The issue of these advice notes to the Receiving Clerk should be at the discretion of the Storekeeper, but under a proper administration there is not much likelihood of the Receiving Clerk neglecting his duty of checking by merely copying out the supplier's advice notes.

It is desirable on general grounds that suppliers' invoices shall not be sent beyond the Works Accounts Office, however trustworthy the Stores Staff may be. The absence of invoices beneficially

Material Receipt. influences the care and promptitude with which the Goods Received Notes are prepared.

Returnable Packages. Adherence to this principle of not issuing the invoices to the General Stores will involve the establishment of a routine by which they are advised as to returnable packages.

There is a tendency nowadays to include packages in the price of goods and for the packages accordingly to be non-returnable. Although the practice of the various suppliers in this matter may be known to the Stores staff, there is some danger of confusion, and also of neglect in returning those packages which are returnable, if the General Stores are not instructed. It is a very simple matter
5-84. for the Works Accounts Office to make out a Returnable Package Card for each package invoiced, and to send these cards to the General Stores.

The difficulty that may arise is in identifying the packages when they come to be returned.

Sometimes the course is adopted of giving a serial number to every package received, but this involves a certain amount of extra work and cross reference, and under most circumstances it will be quite satisfactory and easier to mark each package with the G. R. (Goods Received Note) number.

A suitable routine can be arranged on the following lines :

When the completed Goods Received Note is sent to the Works Accounts Office, presumably never later than the day following receipt of the goods, it will be marked off against their copy of the purchase order, and then sorted alphabetically in a suitable sorting device. As the invoices come to hand the Goods Received Reports will be matched up with them and where called for, Returnable Package Cards will be made out. These package cards will bear on them the G. R. number, the supplier's invoice date and reference, and the value of the package.

When the package is returned to the supplier the Advice of Return will quote the supplier's invoice date and reference and the value of the package. By a suitable note on the Advice of Return or on a carbon copy of the Consignment Note, thus saving work, the supplier will understand that he has been debited with the value of the package. The Works Accounts Office will receive a copy of this Advice of Return, with the respective Returnable Package Card attached and the General Office will be advised as to debiting the supplier by the Works Accounts Office passing on the Advice of Return.

The advantage of this arrangement is that only such packages will be returned for which credit can be obtained, and also that it will be made very easy for the General Stores to ensure returning every such package without further reminder. A further point is that if a supplier's package is used for the despatch of goods, it is only necessary for the Returnable Package Card to be marked accordingly and returned to the Works Accounts Office, for all accounts to be kept clear. Beyond that again the value to be allowed for the package may, in view of the return carriage having to be paid, make it sometimes inadvisable to return the package. To ensure the exercise of this discretion the Returnable Package Card can be designed to call for the amount of carriage payable to be noted. **Returnable Packages.**

The routine may be helped by returning packages on a fixed day each week.

There is in every business a certain number of receipts of goods for which either a purchase order has not been issued, or cannot be readily traced. Most of such receipts will refer to goods sent in for repair or replacement, and it is this latter class that requires special attention. Frequently customers return goods without adequate advice, and in other cases there may have to be investigation and negotiation before a credit can be passed. **Non-Purchase Receipts.**

By instituting an Acknowledgment of Goods Received Form for these cases, it becomes possible to register the receipt right away without commitment as to acceptance of the goods or hasty settlement of credit to be passed. This acknowledgment may be in triplicate, top copy being sent away, second copy to Works Account Office, and third retained at the General Stores with adequate room for asking the reason of the delivery. Often it may be better to leave the acknowledgment as formal as possible, thus leaving the way clear for any line of argument that may seem proper if the customer's contentions are unacceptable. 5·83.

Even when instructions for repair or replacement are quite clear, the acknowledgment of receipt is desirable for internal purposes and also as a matter of courteous treatment of the customer.

In the case of a motor car, for instance, sent in for repair, the Acknowledgment of Goods Received will serve as a receipt to the customer for his kit and obviate dispute when the kit is delivered back again.

It might even be a condition of returning the goods that this acknowledgment form be given up, or its absence satisfactorily explained, particularly where the class of articles repaired lend themselves to confusion as to identity or misrepresentation as to ownership.

Where an acknowledgment is issued for goods that are ultimately

Non-Purchase Receipts. purchased, as distinct from being credited, a Goods Received Note should be issued, when purchase is decided on, to cover same, giving a cross reference to the Acknowledgment of Goods Received Form.

Rejections and Replacements. Arising from the purchase of goods will be the question of goods rejected and other claims. These will be met as to obtaining the necessary credit by an entry by the Receiving Clerk on the Goods Received Note in conjunction with an Advice of Return covering the return of the goods, when such is necessary.

The Works Accounts Office from these several sources make up
6-14. Credit Claim Notes, more often called Debit Notes, for the amounts involved. Invoice differences as to quantities, prices or calculations will be handled by the same routine.

The ordering of the replacements of rejected materials is best dealt with as a new proposition under a new order reference. As a corollary of this all rejections should be charged back to the suppliers through the medium of Credit Claim Notes, and invoices accepted for the replace material. The copies of these replacement orders should be attached to the copy of the original order so that there shall be no oversight in following up deliveries.

The routine for issuing replacement requisitions should centre where the purchase requisitions do, and for materials of production, this will be the Works Office. In a few cases this may be a roundabout way, but for the main part it is the only safe routine and co-ordinates replacement necessities, discovered at the time of receipt, with those arising in the course of production.

Frequently, of course, replacements will result from causes not attributable to the supplier of the material, in which no question of a Credit Claim will arise.

A matter of considerable importance in maintaining the flow of output lies in having reserve stocks of material to meet replacement requirements. These reserve stocks need to be under the control of the Works Office, and for that reason only this office can exercise the necessary discretion as to the issue of replacement orders.

Identification of Goods. The identification of goods while in the Stores is important, and the Goods Received Note (G. R.) number is the most serviceable reference.

This method of identification is particularly appropriate in the case of special purchases or goods bought for particular orders.

5-85. In these cases a Stores Tally may be attached to each consignment, and the issues marked off until the consignment is exhausted.

Further by quoting the G. R. No. on the Goods Issue Voucher the origin of any faulty material may be traced with more ease.

Identification of Goods. 5-86.

The application of the scheme to standard fittings involves the use of separate bins, or preferably separate trays or boxes for each consignment, and this has been carried out with success.

Stock Control.

The subject of stock control is so intimately linked up with production efficiency and stock accounts that the discussion here can only be partial.

Certain aspects of stock control are touched on also under the headings of "Despatch," "Process Accounts" and "Stocktaking."

Stock control comprises three elements :

Safe and orderly custody of the stock.
Administration of stock in the sense of settling the kinds of stock to be held and regulating the disposal of same.
Maintenance of adequate stock.

Very commonly storekeeping, as the care of stock is usually called, does not seriously attempt to control the selection and disposal of the stock, beyond requiring written demands from foremen before issuing goods from stock, or before taking steps to add new lines of stock.

Under these conditions there is likely to be a needless range of stock kept and an accumulation of surplus stock.

Surplus stock may arise from injudicious purchases in regard to quantities, but more frequently by an altered demand consequent on changes in design.

This latter reason is so prolific in causing surplus stocks that the practice of ordering practically all material only as and when required to meet specific orders has a great deal to recommend it, particularly when associated with the holding of reserve stocks.

There is, however, scope for standardisation in regard to goods necessarily held in regular stock. The following are typical items calling for this treatment :

BAR—Steel and Brass—Rounds, Hexagon, Squares and Flats.
SCREWS— ,, ,, —Round Head and Countersunk Head.
STUDS.—Steel.
BOLTS—Steel—Hexagon Head.
PINS—Steel—Taper and Split.
WASHERS—Steel, Iron and Brass.
NUTS—Iron and Brass—Hexagon.
WOOD SCREWS—Iron and Brass—Round Head and Countersunk Head.
FILES—Iron and Brass—Hand, Flat, Half Round, Warding Square, Three Square and Round.
HAMMERS—Iron and Brass—Engineers' Hand, Riveting, Lead.
HAMMER HANDLES.
MALLETS—Hide and Boxwood.

Lists detailing the standard sizes may very well be issued as blue prints, mounted on boards, to all departments. In the case of bar stock, the colours painted on the ends of bars to distinguish the several kinds of steel may be included in such a list by description.

Stock Control. It is suggested that this standardisation be carried out to its logical conclusion in the form of a Stores Catalogue, each size and variety selected as standard being detailed therein and given a reference number on the line of the classification scheme outlined in connection with Stock Accounts.

The selecting of standard sizes and varieties will render "non-standard" the stocks held of other sizes and varieties, and this selection may be expected to furnish astonishing figures as to the amount of really surplus stock commonly held and considered as good stock.

Proceeding to the routine incidental to the maintenance of stocks, it will be much more convenient to establish an ordering level in each case rather than to fix the maximum and minimum quantities to be kept in stock.

Not only should the ordering level be fixed but also the normal quantity to be ordered, and both must have regard to the time required for obtaining fresh supplies and the liability of the stock becoming exhausted meantime. This arrangement effects all that is intended by the idea of maximum and minimum levels, and is merely a more readily applied formula.

As pointed out elsewhere the control of reserve stock, which it may be assumed will only occur with materials entering directly into the Works products, falls peculiarly within the province of the Works Office, and they may have to authorise each issue by means
5-55. of a Stock Appropriation Ticket. In this event the necessary stock control is centred in that office—a record card being kept for each item of all receipts and all issues authorised. The safety of this course hinges on a proper system of stock scrutiny. The routine of stock scrutiny is discussed at some length in connection with Stock Accounts, and it is sufficient here to explain that by scrutiny is meant the checking by an independent party of the stock, to verify that the stock accounts are in order as to the book or account values of stock on hand, and, further, to incidentally verify the accuracy of the Stock Control Cards, on which quantities only are entered.

If, therefore, the stock control cards as kept by the Works Office are brought into frequent review by the process of stock scrutiny—carried out presumably by the Works Accounts Office—there ought to be no fear of reserve stocks becoming exhausted without the cognisance of the former Office. Theoretically, if reserve stock is only issued on specific authority from the Works Office, there should always be agreement between the actual stock in the stores and the stock balance indicated on the Stock Control Cards. It is, however, rarely wise to trust implicitly to any theory where a slip or oversight may be serious in its effect. Apart from the possibilities of stock scrutiny, it may be feasible to have the ordering levels, previously mentioned, marked on the Stores Tallies attached to the bins, holding the items of reserve stock so that the Storekeeper may be in a position to remind the Works Office in good time. **Stock Control.**

Turning to stock items that are not likely to be controlled by the Works Office and that are consequently controlled by the General Stores itself, the necessity for stock control cards will not be so marked.

Stock control cards constitute the means for effective administrative control so far as selection and disposal of stock are concerned. 5·89. They are records that must be at the command of the parties responsible for this control. Their use and development are something apart from the works accounts, and it is very desirable that the stock records, as used for control purposes, shall be largely independent of the stock accounts, as used for works accounting purposes. It is both possible and desirable that both sets of statistics shall be subject to the same classification with sub-classification on either side as experience may dictate.

The stock control cards as kept in the General Stores will be essentially for the use of the Storekeeper, though also available for the purposes of stock scrutiny. It will be desirable for the Storekeeper to always verify the stock on hand before submitting a purchase requisition for further supplies. This is obviously a convenient period with the stock at a low ebb, and enforces a check of every item of current stock in the course of probably three months.

"Wholesale" Stock.

A development of stores organisation having a considerable influence on the stock control routine, is that of dividing the General Stores into two sections of "wholesale" and "retail."

The division cannot be carried out throughout the whole range of stock, and has most practical advantage in its application to such goods as are in unit form, and are served out in relatively small quantities. Fastenings will furnish the bulk of such items.

If the wholesale stock of fastenings, etc., is kept in small even parcels suitable for transferring to the "retail" section—whether within the General Stores or at a sub-stores—the stock control can be concentrated on the "wholesale" stock and the loose stock held for retailing may be ignored in maintaining the stock.

The successful application of the idea means standardising the running lines of fastenings, etc., so as to minimise the number of items to be held in the "retail" section.

This is quite an important point under any circumstances, as

"Wholesale" Stock.

there is frequently an unnecessary variety of sizes held in stock. Wood screws and files are typical items in which this occurs.

Only the standard or running lines would be held in both the "retail" and "wholesale" sections. In the case of non-standard or special lines, the whole of the stock would be held in the "wholesale" section, and fetched as required for issuing.

This being the case, there should be no risk of bad stock actually resulting from there being several retail sections, or sub-stores, nor should any question arise of an excessive margin of stock being necessary to keep the sub-stores going.

This scheme of a "wholesale" section is particularly convenient when the General Stores is on two floors, and when all the serving is done on the ground floor.

Sub-Stores.

For the better working of certain departments it will usually be found desirable to establish subsidiary stores, conveniently termed sub-stores.

There may be also sub-stores dealing with oils and greases, or other special groups of general stock items, apart from any departmental considerations.

It will be necessary to have separate stock control records for each sub-store, if only in the interests of the Head Storekeeper to ease his responsibilities and to locate the stock for checking purposes.

Quite frequently it is expedient, on grounds of economy, to have a departmental store looked after by the shop foreman, without any regular attendant. In such cases the foreman is responsible for furnishing the necessary records of the issue of the stock in his charge.

If the foreman can be persuaded to always book out the goods as and when he issues them, there should be very little inaccuracy—providing always that the goods are not liable to be taken by his men without his full knowledge.

Sometimes the foreman furnishes a weekly report of his issues, but this almost encourages procrastination.

The safer way, and for accounting purposes the prompter way, is for the foreman to make out a Goods Issue Voucher each time he draws on his stock, and for these vouchers to be collected from him daily.

The Works Post system referred to elsewhere will allow the collection to be made whenever the foreman elects to put the vouchers in the post bag.

The transfers as between the General Stores and the Sub-Stores that are directly under the Head Storekeeper need not necessarily be reported to the Works Accounts Office as single stock accounts may be kept by them. **Sub-Stores.**

In the case of sub-stores not in this category, as when under a departmental foreman, the transfers will have to be reported. A Goods Issue Voucher will serve if suitably endorsed by rubber stamp : " Transfer from General Stores to Department.......... Stores. Issue to shops to be reported to Works Accounts Office."

Some of the problems arising in the case of Foundry and Smithy Sub-Stores are considered under the heading of "Process Accounts."

Shop Supplies. Shop supplies constitute a fairly extensive portion of the stock in most General Stores, and by their nature involve a good deal of traffic between the shops and the Stores.

To minimise this traffic, the course is recommended of localising the distribution centres of many shop supplies within the shops, if possible. The use of the Tool Stores is suggested as being usually the most efficient arrangement, if the Tool Stores is properly located.

The responsibility can, with advantage, be placed on the Tool Store Chargehand for exercising a restraining influence on the consumption of supplies by the men.

Whether the Tool Stores shall, in consequence, be considered as constituting, in part, a sub-store under the General Stores, must depend mainly on whether it serves more than one department. If it serves only one department, the supplies as transferred to the departmental tool stores can be charged at once to the department in question, more particularly if only relatively small quantities are transferred at a time from the General Stores. Such a proceeding cuts out a lot of detail work from the stock control records, stock accounts and cost allocation accounts.

Even when a tool store serves more than one department, an apportionment of each class of supplies, based on a weekly estimate from the Tool Store Chargehand, would probably be accurate enough to justify direct charging to the respective departmental accounts.

The essential point to be gained by giving way, if need be, on some fractional accuracy in apportionment of cost, is the saving of written demands from the foreman.

Unless, therefore, the foreman has unquestionably the time to really look after the demanding of supplies, it blocks the way for any other solution if the foreman covers each man's demand by a signature.

If the stock accounting requirements are made sufficiently elastic to obviate any necessity for foremen's signatures, the Tool Store Chargehand can be made to serve a very useful function and achieve

Shop Supplies. surprising economies. His ability to stimulate economy lies in his practical experience of the shop conditions coupled with some simple means of tracing the supplies drawn by each man over any period.

The simple means in question may be established by having each workman give a ticket, say a tool ticket, for what he requires. This brings home his individual responsibility in the matter and provides a means whereby he need not wait for his foreman, and, further, that allows him to send a labourer or messenger for what he needs. The same ticket as used for borrowing tools will serve for this purpose, and the Tool Store Chargehand can file the tickets used for supplies in a rough card cabinet behind cards bearing the men's numbers.

An alternative and better method to that of preserving the tickets is to enter the issues on sheets ruled into a hundred squares, on Cross Index Sheets as referred to in connection with Casting Instructions. In the respective squares, which will represent check numbers, a mark, either dot or stroke, is made for each issue—there being different sets of sheets for different supplies. This is virtually a graphic method, the superabundance of marks in any square being very evident to the eye.

The graphic evidence is clearer and economy the more likely if trouble is taken to serve out supplies in a regular way. Thus red lead or emery powder can be served in small tins, each tin containing just enough for a serviceable mixture to be made, and the workman will appreciate the convenience. Emery cloth, to take another example, may be served out possibly in single half sheets. These economies may seem over-strained, but what might be called " decimal point " economies have a way of counting up in the course of time—just as for the opposite reason " decimal point " excesses cannot be safely ignored.

The possible economy in distributing files from the Tool Stores will be recognised by those who have tried utilising the General Stores to keep down this expense. Rules limiting each fitter to a certain number of files per week defeat themselves, and files are deliberately put out of action to ensure an opportunity of demanding the full quota of new files each week. There is no economy in arbitrary restrictions as to file consumption, but there is need for supervision.

By the squared sheet, semi-graphic method, the Tool Store Chargehand can exercise quite sufficient supervision by noting the class of work done by each man. The comparison of one man's consumption with another's will help to indicate fair allowances in every case.

All such records will be worth keeping and may occasionally be looked through by the Works Manager, and quite frequently by the Stock Checker or Scrutineer.

Shop Supplies.

Fresh sets of sheets should be made up for each fortnight, and there is nothing to prevent these records being utilised for cost allocation purposes if it is felt that direct charging to departments as the supplies are transferred from the General Stores is undesirable.

Some modification of procedure will be necessary if any shop supplies, such as files, are charged to Sales or Production Orders instead of expense accounts. Such a course is not unusual in repair work, as the basis of invoicing may make it necessary to do so. In these circumstances, the tickets filled out by the men, or it may be by their chargehands, could, by stating the order number, be made to serve as Goods Issue Vouchers in the Works Accounts Office—the charge for supplies against the department being proportionately reduced.

The foregoing remarks, at best, can only apply to a limited proportion of shop supplies and local convenience must settle how far the scheme can be carried.

Fuel, particularly for power purposes, is a very important item of shop supplies, and its consumption can hardly be regulated through any ordinary stores channel.

The case has been stated elsewhere as to the necessity of a periodical report, for administrative purposes, by the Power Engineer, stating the output of power, cost of labour and consumption of supplies. The simplest course will then be to make the Power Engineer, or person acting in that capacity, responsible for correctly allocating the consumption of fuel each week, and responsible too for any shortages in the fuel stock. It may be wise to have the Power Engineer make the report direct to the Works Accounts Office rather than through the General Stores.

There are items in the category of plant supplies, which are also not quite easy to control from the General Stores.

A case in point is building materials, when used on small repair jobs. The larger jobs can be dealt with better, as special purchases will usually be made which can be charged direct.

There is the question, too, of discarded plant and building material that is not sold but held in stock for consumption on repairs and alterations. This matter is also discussed in connection with the valuation of Buildings and Fixed Plant.

Stock material, whether new or old, passed into the charge of the Building or Millwrights Departments can only be allocated through the medium of a report by the respective foremen in lieu

Shop Supplies.

of an organised departmental store, which is unlikely to be necessary in any ordinary works. The more goods that can be held in the General Stores the less room for inaccurate allocation.

In the case of supplies for electrical repairs, the new materials required should be issued, as far as practicable, in detail for each job from the General Stores, and comparatively little stock held by the Electrician.

One item requiring special treatment is the stock control of the incandescent lamps. While the General Stores should hold the "wholesale stock," the retailing should be a personal responsibility of the Electrician, who must keep statistics of the actual distribution of the lamps if proper economy is to be effected.

It may be worth while to number each lighting point, as street lamps are numbered, and to indicate them on a Works plan.

The mere exchanging of new lamps for old ones may control the number of lamps in the shops, but in no sense does it ensure the proper use of lamps.

The Electrician must needs exercise judgment and be supported in reasonable economies.

The new lamps when only issued to the Electrician in small lots can be allocated at once to the Lighting Expenses Account.

There are a certain number of appliances used in a Works that are tools in one sense, but which it is rather unusual and inconvenient to bring under the direct control of the Tool Stores.

Except on the ground of convenience, it might be argued at once that the General Stores should only hold the "wholesale" stock in such cases.

The typical items in this category have been listed in the General Stock Classification under Utensils and Implements—a heading chosen to avoid implying tools in the usually accepted shop sense, although some are obviously of that character.

The General Stores may serve out to some departments, not handy to the Tool Stores, utensils and implements on loan, and it is sound economy to treat all issues of these things to the workmen as loans, despite the fact that they may be rapidly consumed and require early replacement. The routine suggested for the ordinary tools issued from the Tool Stores on permanent loan, whereby the man has a Tool Book in which the loans are entered and against which items the replenishments are noted, can quite easily embrace the General Stores for specified articles.

A shop labourer might even have a Tool Book in which his broom and brushes are entered. The practice stimulates economy and involves no additional clerical work, possibly less, than the usual authorisation by the foreman.

Shop Supplies. Utensils and implements issued from the General Stores to the Tool Stores should, if possible, be allocated at once to the departmental expense account concerned.

Timber. Timber stock has its own peculiar problems. When the stock is considerable a special attendant is necessary, and the technical knowledge requisite for properly handling timber, may place the timber stock outside the Head Storekeeper's control. The supervision may, in that case, be vested in the Woodworking Department Foreman, though the better compromise is probably to have an attendant with sufficient timber knowledge to be responsible, in the first instance, to the Head Storekeeper, but subject, on technical matters, to instruction from the foreman or other qualified party.

Not infrequently the responsibility for requisitioning timber rests with a higher official than a foreman, and this party would then control the Timber Stores Attendant.

The principal difficulty with timber stock arises from what is called conversion, that is, converting timber from one shape to another. For instance, timber may be brought in the log and cut into deals or planks, and these again, perhaps, into boards. Each conversion means labour cost and waste of material in the form of sawdust.

The labour cost of conversion may be supplemented by the cost of drying in special ovens apart from the cost of handling in the process of seasoning and storage rental.

Another problem is the surplus material left from planks or boards, when cut up in the making of product or patterns. This surplus may only be useful as firewood in part, but it is far from all being scrap.

One factory makes file handles and other handles out of certain of its scrap. This means the installation of suitable machinery that only a large works can very well employ sufficiently to pay. In smaller works such timber might be sold, if only for toy-making, rather than burnt, though wood waste as boiler fuel can be made quite a satisfactory proposition.

Assuming a proper ecomony is exercised in regard to the timber generally, there is always the problem of allocating the timber used to the proper orders. A fine degree of accuracy is not likely to result from any method nor perhaps is it necessary.

On large contracts the percentage of error in allocating on the assumption that all the timber drawn, or even ordered, for the work is used, may be negligible. On smaller jobs the error may be more marked, but even then the money value of the error may not justify many refinements in the accounting.

Timber. The best compromise seems to be for each joiner and pattern-
5-88. maker to make out a Timber Ticket for each job, stating the thickness, width and feet run of timber used and wasted—assuming the small scrap timber to be waste, which it may not be.

When these tickets are passed to the Timber Store Attendant, who will extend each item into superficial feet (12″ by 1″ section), or cubic units (1″ by 1″ section by 12″ long). He can then note the quantities on stock control cards arranged with five columns :

Column 1—Quantity received from outside or from conversion.
" 2—Quantity sent into shop for use or conversion.
" 3—Quantity left in Timber Stores.
" 4—Quantity accounted for by shops or returned to Timber Stores.
" 5—Quantity in shop unaccounted for.

This scheme makes it easy to adjust the stock control records as necessitated by conversion—the receipt of the converted timber being entered in column No. 1 of the stock control card used for the new size or scantlings, and not on the original card.

All timber as received should be marked with the G. R. (Goods Receipted Note) number and the date.

Converted timber should be marked with the conversion order number and date, the origin of the timber being indicated on the conversion order.

Specific orders for each conversion are advocated to regularise the work and to avoid the use of standing orders in the shop. These orders might be made out by the Timber Stores Attendant.

Apart from booking out all timber issued, the attendant needs to record the moving of timber in the stacks, and to keep a current plan of the timber stacks.

Component Stock. The lines to be followed in the stores organisation with regard to component stock must be largely influenced by the existence or otherwise of a Work-in-Progress or Work Depot, and this influence will be regulated by the policy and methods adopted in the manufacturing of stock product.

If the practice is adopted of putting through Stock Manufacturing Orders for complete products, as distinct from individual components, the function of the Work Depot will be extensive. This depot will then collect and hold the components as they are finished for each order, in readiness for assembling, and be responsible for
5-108. delivering the complete product to the Warehouse.

When all components are individually put into stock as made, and issued from stock for assembling purposes, the functions of the Work Depot will stop short of holding finished components, and a proportionately larger field will have to be covered by the general stores organisation proper.

In the normal course it may be assumed that rough components (castings, forgings and stampings) made for specific Stock Manufacturing Orders will not go into stock literally, but will be allocated as received into the General Stores to the respective orders.

Component Stock.

When the cost of rough components has been allocated at this stage, the components may be transferred in bulk to the Work Depot or issued direct to the shops from the General Stores, though the former course is to be preferred.

Reserve stock of this character will be however retained in the General Stores, and the initial charge debited to Stock accordingly.

When the practice obtains of making the individual components for stock, the transaction of withdrawing them from stock for assembling purposes is apt to be tedious in the amount of detail required.

The best course will usually be to use an Assembly List with a covering Goods Issue Voucher for each issue.

Even when a number of the items in any Assembly List have to be struck out as not issued at the time, the list is still advantageously used by facilitating the entries and records for stock control and cost allocation purposes.

In the case of spare parts, or finished components, held in stock in readiness to meet customer's requirements, consideration may be necessary as to the advisability of holding the requisite reserve stock mainly as rough components, as previously discussed.

In some industries, as for example, motor car manufacture, the spare part proposition may be large enough to justify its own special stores.

In any case, it may be taken as of prime importance in the regulation of the Works production that spare parts should not be held in the same store with the finished components intended for assembling.

Generally speaking, the Warehouse will be the most suitable centre for holding the stock of spare parts. Their responsibility for despatching orders should ensure the necessary personal interest in maintaining the stock of spare parts at the approved level.

When the pressure of sales fluctuates, it may be policy to take advantage of any opportunity that arises of getting the reserve stock of rough components converted into spare parts.

The problem of economically and promptly manufacturing spare parts is often of a harassing character, and is only to be solved by unceasing watchfulness. In some works this is so serious as to make necessary a separate spare part production department.

The decisions as to the proper level of stock to be maintained must be based to a large extent on experience with each design of product. The records of spare parts used to meet Sales Repairs

Component Stock. and Sundries Orders must be carefully kept in some card index or loose leaf form, with a separate card or sheet for each spare part, so as to automatically accumulate the data necessary to settle these stock questions. Such statistics will require to be used with discrimination, as weakness in design of particular parts will create excessive but temporary demands until remedied. The matter is one essentially of conference of suitable representatives from the Drawing Office and the Repairs Department with the Works Manager. All stock authorisations of this character require to be periodically revised.

Issue of Stock. Some further reference is necessary to the routine for obtaining goods from stock. As to reserve stock, it has been recommended that the Works Office should furnish the necessary authority,
5-55. which involves sending a Stock Appropriation Ticket to the General
5-86. Stores and a Goods Issue Voucher to the party interested in withdrawing the goods. The term voucher is applied to emphasise the functions of the form and to enhance its importance in the relations of the Stores to the shops.

In the matter of special purchases, which may, if the policy of reserve stock is adopted, cover the bulk of the material used in production, some arrangement is necessary whereby the Departmental Foreman concerned is advised as to the arrival of the material. It may be desirable, and under any thorough organisation, it will be necessary, to regulate the issue of these materials in accordance with the production programme obtaining at the moment. Very frequently entire discretion is left to the foreman as to withdrawing material from the Stores. From the Stores point of view the sooner special materials are issued to the shops the simpler their work, but want of reasonable discrimination in this direction is likely to cause a great deal of trouble.

Quite often the Stores accommodation is on too niggardly a scale for the Stores to carry out their proper function of storing goods until wanted. Under such conditions the shops are forced to take materials before they are ready for same, to the detriment of the work in progress. The principle of keeping the shops floors clear of materials not in process of being worked can only be adopted in conjunction with a suitable Stores system with suitable accommodation.

The better compromise is to have a Work Depot, so called here to avoid confusion with the General Stores, where material not in progress can be held and from which the production can be largely regulated, on the lines discussed under Production Efficiency.

It is not necessary that a Work Depot should be more than a railed off portion of the shop served by a crane. Even a broad white band painted on the floor would be sufficient in some cases.

Issue of Stock.

This Work Depot can take over materials as received at the General Stores, more particularly castings and forgings, and issue them in batches according to production requirements.

Under these conditions, the Work Depot would require the notification of arrival of material and the foremen would get their work from the Work Depot.

Whether the Work Depot or the Shop Foremen deal direct with the General Stores as to withdrawal of goods received from outside, it will be found a most convenient practice for the General Stores to prepare a Goods Issue Voucher for each receipt of material purchased for a specific order. This voucher will be blank as to a receiving signature until presented through the proper channel in exchange for the material. The vouchers may possibly be passed first to the Works Office, if such exists, for their information and possible regulation as to the time or rate of issue of the material to the shops, and thence passed to the Work Depot, or direct to the Shop Foremen to obtain the goods in question.

Whether this routine is needlessly roundabout will depend on conditions, but it will be better avoided in those shops that are run in a state of turmoil and panic, either continually or occasionally. Deliberate methods can be made irresistible in their working, and in proper hands will effect much more than unbalanced hustle.

Turning to ordinary or general stock the General Stores can hardly prepare Goods Issue Vouchers in advance, and these must, therefore, be made out in other quarters. In the matter of shop supplies and tool stores replenishments, the vouchers may be written out and signed by the Tool Store Chargehand, while for production material, the Work Depot may make out the vouchers or the Shop Foremen, as the system adopted may provide. Whatever general scheme is adopted in this matter some compromise to suit various conditions is likely to be necessary.

The use of Quantity Slips for controlling the issue of materials is capable of application not only to regular production, but also to customer's repairs and even to works repairs.

In the matter of customer's repairs, where an estimate has been made, this control of the new material to be used is often very important. In such cases the Storekeeper would mark off all items as issued, and refuse further issues except the Quantity Slip be amended by the proper authority.

The economy exercised in connection with works repairs by this method can be very marked.

It is probably sounder in principle to first authorise the Goods

Issue of Stock. Issue Vouchers from the Quantity Slips than to expect the General Stores to test the validity of each voucher against this list before issuing the goods.

A point not always properly appreciated by Storekeepers is the importance of identifying all issues of stock in such a way as to ensure a correct understanding in the Works Accounts Office as to what has been issued. So far as the Goods Received Number can be quoted the identification is complete, but for stock generally, a classification reference is about the most satisfactory alternative. This matter is considered at more length in connection with Stock Accounts.

Returns from Shops. A certain amount of material is likely to be overdrawn by the shops though under a proper system of stock control this will be reduced to small proportions.

Taking the everyday case of steel bar drawn for machining in longer lengths than will actually be used. The excess length may be intentional for chucking purposes in the machine tool, or may be accidental as being the nearest length available in the Stores.

If bars can be cut off to length within the Stores the excess quantities issued will be more moderate than when cutting off has to be done in the Machine Shop. On the other hand, there is no certain economy in having the excess length very small lest there be no more than scrap value in it when returned to the Stores.

Under a stock control system whereby the approximate net quantity of material actually required is specified on a Quantity Slip, the excess is, within small limits, a known quantity and can be dealt with as on loan to the shops.

The shop loan arrangements should ensure the excess material
5-87. being returned accompanied by a Shop Credit Slip. From this slip the stock control record, stock account, and cost allocation account will be adjusted by a proportionate reduction.

The Shop Credit Slip can very well be made out, except as to net quantities, by the Stores and given out with the material in the first instance. This will simplify the routine and if a carbon copy is retained, it will be a simple matter to see that all the slips are returned, and therefore that all shop loans are accounted for.

The necessity of returning excess material to Stores is very marked where fine distinctions in metals exist, such as with steel bar, lest the surplus be applied to quite a wrong use.

There will be other returns from the shops which cannot be foreseen definitely, mainly swarf, or borings, and defective material.

Defective material should preferably be returned to the General Stores through the medium of the Work Depot.

Returns from Shops.

Swarf of non-ferrous alloys, such as gun-metal, in view of the values involved need to be the subject of Shop Credit Slips, particularly to get as much as possible credited to the original orders in connection with which the swarf has been produced.

Some responsibility in the matter can probably be attached to the shop labourer, whose interest in the collection of swarf in a clean, unmixed condition can be stimulated by a bonus on weight delivered to Stores. Surprisingly improved prices have been obtained for swarf as the outcome of a small bonus of this sort, say, sixpence per hundredweight.

The shop labourer may very likely be able to write in the few particulars requisite on the Shop Credit Slip, and obtain a confirming initialling from either the mechanics, from whose machine the swarf is being collected, or from the chargehand.

Certain classes of scrap, particularly iron and steel, accumulate under conditions that only allow the quantities to be taken when the scrap is disposed of, and consequently it is only then that the necessary Shop Credit Slip can be made out.

Stationery.

Stationery is not usually considered as pertaining to materials, or even to Storekeeping. A marked economy can often be effected by proper control of this class of stock, including therein office supplies and drawing materials.

It is not suggested that a value be placed on this stock though that would be admissible for ordinary commercial articles not bearing the Company's name, such as pencils, drawing paper, memorandum books and the like. Typical items of this sort are included in the General Stock Classification.

The control of the stock of printed forms incidental to modern routine methods is important, not merely on the score of economy but as bearing on the successful running of the routine organisation. Provision for stock control and standardisation of forms should precede the institution of modern methods lest the new systems lose prestige through form supplies running out or being costly through injudicious purchasing.

The principles of stock control should, therefore, be applied to stationery whether the Stationery Stores be within the General Stores or not. The scheme of wholesale stock will make the plan more workable. Issues to departments may be according to fortnightly applications from departmental heads, and the Management should encourage carefulness in this direction without instituting unreasonable restrictions.

Production Efficiency.

General Considerations.

PRODUCTION efficiency as a subject might be said to cover the whole field of works management. It is, however, thought to be an appropriate title for those factors of management formerly more usually associated with foremanship and having only a slender connection with the works routine requisite for the purpose of works accounts. The dividing line must needs be somewhat arbitrarily drawn.

For those who have followed the published investigations and theories advanced in the direction of production efficiency, more particularly in America, it may help towards the focussing of the subject matter of the present system if it be compared with what is generally known as Scientific Management. The ground to be covered is certainly not unlike, but the method of treatment is not such as to establish any close parallel. There is no attempt here to demonstrate that there are any golden rules for achieving production efficiency. It is certainly hoped that the discussion offered will help the reader to diagnose his own case, and it may be to see his way to follow some of the suggested remedies or methods in principle, if not in detail.

Scientific Management has come to mean a more or less scientific line of treatment in the shop administration without very much regard to any local limitations. Just as for instance in striving after design efficiency there must be recognition of local commercial limitations, so in regard to production efficiency regard must be paid to the limitations imposed by the circumstances of each case.

The fact that these limitations have to be recognised sooner or later, and are mostly of a latent character—only to be discovered as the search after efficiency proceeds—makes it futile to attempt to lay down any golden rules of procedure.

It is the stress on the management entailed by any persistent pursuit of efficiency that makes the idea of any science in management an uninteresting proposition to many managers. The lack of interest may arise from incapability for better things, or from prejudice due to self-satisfaction with existent practices, or even from lack of courage. Present financial success is often a difficulty in the way of attempting any increased efficiency in production, although that may be the only way of maintaining that financial success when commercial conditions shall have become less favourable.

No organisation can have permanence except it grows, however gradually, and its vitality is the reflex of the stimulus it derives from every routine carried out. Organisation, for instance, that merely collects statistics and makes no contribution thereby to the general welfare of the administration has no practical use, and is only kept

General Considerations.

in movement, one can hardly say kept alive, by the artificial and arbitrary exercise of authority.

In the present connection it may be stated to begin with, that organisation can never be a substitute for good men, and further that while proper organisation ought inevitably to weed out the inefficients, it ought not to hinder the full exercise of the best qualities of the best man, be they employed as foremen or in any other capacity.

As remarked elsewhere, a foreman's principal function is that of supervision, and it is in that field he should be a specialist. The many other duties that he commonly undertakes, although admittedly related in a measure to supervision, have only become his because they were no one else's business and had to be negotiated somehow before the work could be produced.

The line of treatment to be followed here is that supervision is the unquestioned and particular province of the foreman, and that certain other functions that he frequently partially or wholly performs need not necessarily fall to his lot. The further point will be made that, generally speaking, the end of production efficiency can be best served by developing the organisation so as to greatly increase the attention given to each of the elements that can be dissociated to any extent from the foreman. The present discussion therefore, is divided under the following heads :

Sub-Orders
Progressing
Plant
Tools
Ratefixing
Inspection
Supervision

Sub-Orders.

The relation of sub-orders to production efficiency lies in the means it provides for giving the requisite fluidity to the stream of the work as it progresses through the various processes and operations. The office orders as they reach the works can hardly be in such a form as to be satisfactorily used to regulate the flow of the work.

The Office, using the term in the general sense as colloquially used in the average Works, are concerned with the delivery of the complete product as called for by the respective Sales Orders. The Office are not concerned to appreciate the difficulty arising in the Works from the necessity to apportion the limited producing capacity, in its various elements of machine and men, in such a way that all the product required by a certain date shall be ready in time.

It will be obvious that with a limited shop capacity, that is, limited in relation to the requirements asked of it, precedence given to one order must be at the expense of another, except so far as the producing equipment allows simultaneous attention to more than one order.

If the need of using discretion as to the precedence allowed to the

Sub-Orders.

various orders at the several stages is admitted, then it must be recognised that this discretion is in the nature of planning the sequence of the work. A good deal of planning of this character is commonly done at short notice by the foreman, having regard to the work immediately available for putting in hand and the position generally of orders as to relative urgency.

Usually, too, the quantities in which the foreman thinks are the requirements of the whole order and the planning goes little further than starting work on the respective lots of components required, leaving to subsequent events the decision as to how far the operation in question shall be carried through for the whole lot. It works out in practice that good intentions are being constantly frustrated, and jobs started in good faith one day are set aside the next in favour of a job found to be more urgent—one probably that was not available for starting the previous day when the opportunity of taking up a new job occurred.

A very little consideration, even by those having only a nodding acquaintance with workshops, will show that the work in progress, that is work available for progress, is in continual movement and cross movement, so that a highly experienced judgment is called into use to exercise anything more than a hand to mouth discretion in the starting up of jobs if, out of all this incessant activity, is to emerge the right product at the right time. What usually happens is that the various components necessary to the complete product ultimately emerge one by one and stand by until the last one arrives.

A certain amount of fitting or erecting may take place pending the arrival of the laggard components but such conditions of working militate very seriously against any proper economy at that stage. The time at which the last component for a given complete product is finished virtually marks the time of useful readiness of all the others.

There will be considerable differences in the time necessary for piloting the respective components through their various stages of production and this means that there ought to be all that difference in the time of starting work on the components, if delivery of the whole set or sets is to be synchronised at a given date.

In planning the work in the shop, foremen commonly send the respective jobs, as they become ready for further operation, to the machine or man whom it is intended should do the job. Then when the occasion arises for a new job,one is selected from the accumulated jobs round the man. This statement is, perhaps, only approximately true as foremen do not usually lose cognisance of urgent jobs that have to be provided for before they actually arrive at the next operation. Speaking generally, there is a great deal of what may be called

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opportunism in the shops as regards the work, and jobs get started, and may be finished, not so much because they constitute the jobs that ought to be started and finished at that time but rather because they happen to be available.

Any job done in advance of its proper turn means or is likely to mean, the dislocation of output, in that it tends to prevent the completion of output proper to the period concerned.

There is no doubt that regularity of output, that is of product ready for sale, is of prime importance, and is the only sure indication of effective organisation.

For financial reasons alone, it is highly important to make deliveries of some class of output each week and there is a good deal to be said for arriving at some approximate equality in the selling values of each week's or each month's output.

Sub-orders are the means by which office orders are split up into proportions suitable for the proper arrangement of work, requisite to the attainment of regularity of finished output value on the one hand and delivery to a predetermined schedule on the other.

If the basis of the output programme be regular weekly deliveries, it would be consistent with such a programme to issue separate sub-orders for the batches of parts necessary to each week's intended output. This might, however, give a quite unnecessary number of sub-orders—perhaps the only department literally regulated by the weekly output schedule being the Erecting Shop or whatever department makes delivery of the finished product. The Smithy and Foundry should work to a programme of weekly delivery without, perhaps, necessitating corresponding sub-orders.

There is no doubt that whatever the process or operation in question, the larger the batch that is dealt with at one time the lower the costs of production will be, provided and only provided that the several operations are carried through without interruptions. What so often happens is that the theoretical economy due to putting through relatively large batches is largely discounted, if not quite negatived, by the almost inevitable necessity to break the batch at some of the operations. Once a batch is broken as to the completion of any operation, then the portion that happens to be ready for the next operation is likely, by pressure of delivery requirements or other cause, to be carried forward to that operation. The net result is that once a batch is broken at any stage the chances are all against the batch ever becoming complete for the remaining operations and quite possibly even further splitting up may ensue.

The loss consequent on interrupting an operation must vary with the time required for getting ready to re-start when the job is picked up again. However small the loss may be demonstrated to be, in

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any given case, it must be a loss and must react unfavourably on the worker's extra pay and on the control exercised by the foreman.

In mass production, where there may be said to be a continuous stream of identical articles undergoing the same operation, the liability to interruption is less marked than under ordinary conditions. Where there is a special machine set up for each operation on each piece, as may be said to be the ideal conditions for mass production, interruptions are still liable to arise through the great differences in the time taken by the several operations, and the great difficulty of always balancing the producing equipment to meet these varying operation times.

Under such conditions the chances are that there will be little attempt to batch the components at all but to merely let the work flow as best it may from operation to operation. If the volume of work in progress is only heavy enough, there will be ample work in hand for each operation so that interruptions due to shortness of work to operate on at any point will be obviated. This solution, if it can be termed that, involves a relatively heavy capital expenditure in work in progress lying virtually idle, and makes it a very lengthy matter to pilot any line of product through the shops that has not been made in sufficient quantities to have accumulated the necessary relays, as it were, of work waiting at each operation.

This reference to mass production is not an attempt to legislate as to how to apply sub-orders in such cases, because the proper solution must always be one peculiarly adopted to the precise conditions of each case. It is, in fact, the fixity of the conditions pertaining to mass production that afford favourable groundwork for refinements in production efficiency. Beyond that, the very fact that the methods adopted as the result of particular experience are refinements, makes them ill-adapted to the cruder conditions incidental to production that is not within the category of mass production. It seems better in all the circumstances to take as the basis of discussion conditions of production that are not fixed and, therefore, not susceptible to any refined balancing of the plant to eliminate the liability of interruptions of operations.

Assuming that the scheme of handling work in large batches usually breaks down in practice, there seems a need to arrive at a compromise in the matter so as to minimise the risks of interruptions and delays.

The contention made here is that the size of a batch of components should be such that it will be feasible to lay down a hard and fast rule that the batch shall not be broken at any operation. This means that the batching for each kind of component must be adapted to the delivery requirements on the one hand, and the time required for the operations on the other.

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This question of the proper size of batches is in no sense academic for under none but the rarest circumstances will there be a margin of time as to delivery that will allow the work to accumulate at one operation, before some portion is passed on to the next operation. There is a right time for starting every operation, neither too soon nor too late, and only by doing the proper work at the proper time can any serious or successful attempt be made to live up to a schedule of deliveries.

The deliberate disintegration of an order into sub-orders or batches is to neutralise the effect that interruptions will have as to throwing out of gear, the delivery scheme on the order as a whole.

If the batching, however, only represents ideals of what one would like to carry through at one setting at each operation and ignores the severe practical limitations of the particular shop concerned, then it is likely to be only a delusion and a snare, and will be little better than handling the whole order as nominally one batch.

Sometimes the idea regulating the size of batches is not so much to regulate production as to get costs of production without having to wait for the completion of the whole order and also of comparing the costs of successive batches. Here again the liability of batches, decided upon in this arbitrary way, becoming divided or split at one or other operation makes it nearly, if not quite, an impossible task to obtain reliable allocation of time spent on each nominal batch.

When, however, the batching is planned on the lines already indicated, so that no interruption of any operation need be tolerated except as between succeeding batches, then there need be no difficulty in identifying each batch right through its course by the sub-order reference covering the batch, and correct wages allocation becomes reasonably assured.

The fact that the batches are made small enough to be manageable does not mean that a number of batches shall not be dealt with in succession at any one operation if the machine concerned is available. What it does mean is that, if any batch is started on for any operation, at least that batch must be completed as to that operation, before diverting the machine to another job.

Further, it is not essential to this principle that each batch must be completed for the one operation before being passed to the next. The next operation may be started just as soon as its progress is assured against being held up through overtaking the work coming through from the preceding operation.

The matter of defective work, whether arising through faulty design, material or workmanship, often plays havoc with the best

Sub-Orders. laid schemes of production, and the system of sub-orders here advocated may be made to lessen the risks of delay or oversight in obtaining replacements. It may, to that end, be practicable under some circumstances that no batch in which any item has been rejected shall be proceeded with until the replacement is to hand, so that it may again go forward complete in point of quality. This replacement may be put in hand under a separate sub-order reference, consisting of the original sub-order number prefixed with X and carried through the operations necessary to bring it to the same point as the original batch—possibly in association with other batches. When the replacement joins up with the original batch the X reference drops and the *status quo* is restored.

The feasibility of applying this principle will be greatly enhanced if reserve stocks are held of rough components against such contingencies. In mass production, it is likely to be better not to make up for rejections, but to reduce the quantities called for by the Stock Manufacturing Orders accordingly.

Another problem, especially in the Machine Shop, is that arising from the diversion of components intended for one order to some other more urgent order. This diversion or transfer may have to be effected at any stage of production. As regards replacement under the sub-order that is robbed, this can only be very well dealt with on the same lines as provided for the replacement of defective work. A fresh sub-order becomes necessary for the transferred component or components. With batches of the dimensions likely to accord with the principles outlined here, the proper course may be to complete the whole batch in hot haste before diverting any of the components. In any case there is room for much discretion.

The difficulty in the transfer of the costs may be got over very
5-98. well by having an estimate made up on a Viewing Report detailing the circumstances. This is suggested as affording a convenient routine and one consistent with making good the transfer as a replacement under the original sub-order reference.

The form of the sub-orders, in the case of the Machine Shop, may conveniently be that of a tag or tally designed to accompany the
5-100. work through the shops, and conveniently called a Work Tally. It may provide for entries by the viewers after each operation, if such viewing is in force, and in any case provide for the entry as to any rejected or transferred items.

The tallies should also bear the dates by which the components are to be finished, which may conveniently be expressed as the "due date."

The routine in connection with the issue of Work Tallies is discussed further under the head of Progressing.

Having dealt with the batching of components on lines that will make it possible to marshal or regulate the work in progress, the next stage is to discuss the medium by which the regulation shall be affected and generally the questions arising under this heading, which is here called " progressing " as a short and generally admitted term. **Progressing.**

Progressing is not, however, merely the regulation of the sequence of work in the shops however important that aspect may be, but includes the larger outlook of seeing that drawings, assembly lists, patterns, tools and material are all ready at the proper time. 5-52.

The settlement of what is the proper time follows from the laying down of an output schedule as already discussed.

Progressing is not considered here as covering the preparation of the output schedule, but as having reference to the steps necessary to meet the delivery requirements thus laid down.

These steps seem to fall naturally into three groups. Firstly come drawings, lists, patterns and tools, and these may be said to be preparations for production. Next there is the matter of obtaining materials, and thirdly, the question of actual production or production sequence.

The preparations for production involve close touch with the Drawing Office, and any attempt to regulate their work calls for an authority free of departmental bias.

It is thought better, therefore, to delegate this phase of progressing to the Estimating Office or possibly to the Works Office.

In the Works Office there needs to be a Production Section for the matter now under discussion, a Rate-fixing Section, a Tool Designing Section, and so on as local circumstances may determine.

The Works Office will perform the function of settling the due dates for materials to be received and for production to be completed, so as to co-ordinate every stage with the actual delivery requirements. It is suggested that the Works Office shall prepare the purchase requisitions for materials entering directly into product in view particularly of the question of reserve stock.

Turning to the second phase of progressing, viz., materials, this has been discussed at some length under the heading of Materials. It is assumed that the Works Office will fix the delivery requirements for each purchase, and that the General Stores will be responsible for looking after the deliveries. The Works Office may very reasonably exercise some oversight in the matter, in case the General Stores should omit to give appropriate attention to any purchase order.

The third phase, that of production sequence can, it is held, be

Progressing. best dealt with in the shops, through the medium of what may be called the Work Depot. This name, as already mentioned, is adopted to prevent confusion with General Stores and Tool Stores.

The routine of the Work Depot can with advantage be made to 5-104. include the issue of sub-orders, following the lead that may be given by the Works Office on the Assembly Lists. If the Work Depot Chargehand has the requisite judgment he may be left with a very free hand as to sub-orders. Some freedom of action is necessary to allow the varying shop conditions to be met with discretion. He will be responsible to the head of the Production Section in the Works Office.

The Departmental Foremen will have something to say as to the maximum size of batch they are prepared to pilot through without splitting at any operation, and the Work Depot must be able to give and take a little with the shops in these matters.

Once a sub-order is issued, it must be binding, except it be revised in proper form by the Work Depot.

5-100. The Work Tallies, or Machining Sub-Orders, may have a coupon attached which, on issue of the tally, is cut off and retained in the Work Depot as a tracing coupon to show the sub-orders outstanding in each department. One suggestion is that the Work Tallies be issued to the foreman concerned to draw the material, as a notification that the material indicated is available.

On completion of sub-orders the respective tracing coupon should be sent on to the Works Office as a notification of work completed.

The Work Depot is primarily a collecting and distributing station for all work in progress. Its functions and responsibilities commence only with the receipt of material from the General Stores, though it may be concerned with obtaining deliveries to time from the Foundry and Smithy when they form part of the Works. Castings and forgings bought outside should be looked after by the General Stores.

In receiving material from the General Stores, the Work Depot can very reasonably sign and if need be originate the requisite Goods Issue Vouchers. In doing so the order reference will be that of the office or whole order, as the sub-order will not have come into being. This, of course, is better for the General Stores as giving the reference that they require and expect, though, as a consequence, when the vouchers reach the Works Accounts Office it will only be possible for them to allocate the material to the main order, whereas the wages will be allocated to sub-orders. This is hardly a fault, however, as the value of sub-order costs lies mainly in their relation to wages and the almost useless splitting up of material costs to correspond will be better avoided, thus saving a good deal of clerical work.

Progressing.

It will be necessary for the Work Depot to advise the Works Accounts Office as to sub-orders issued by means of a Daily List, or carbon copies of Assembling and Erecting Sub-Orders. 5-103. 5-101. 5-102.

In the case of special purchases, the General Stores can with much advantage originate the Goods Issue Vouchers as an advice to the department concerned, and under the present proposals, this will mean, for the most part, the Work Depot, as being the collecting centre for the machining and fitting departments.

The Work Depot may elect not to receive at the moment the material thus advised and can hold the open Goods Issue Vouchers as reminders accordingly. It will be borne in mind that the goods will have been labelled with a Stores Tally bearing the G. R. (Goods Received Note) Reference and this G. R. No. will have been indicated on the Goods Issue Voucher, so that no mistake should arise from any delay by the Work Depot in accepting material. This places the facilities of the General Stores for temporary storage virtually at the disposal of the Work Depot.

Further, the Work Depot may elect to take only part of the material available, and this will be handled by making out new Goods Issue Vouchers, and marking off the quantities thus taken from the original voucher sent in as an advice by the General Stores. The General Stores on their side will mark off the partial issues on the respective Stores Tallies.

This partial withdrawal of material is an essential condition where reserve material is ordered together with that known to be required.

It will be better, as already stated, that the control of this reserve material shall be vested in the Works Office and that they shall apply the material by issuing suitably marked Goods Issue Vouchers to the Work Depot, and at the same time send corresponding Stock Appropriation Tickets to the General Stores.

In the matter of what may be termed "bulk" material, such as bars and sheets, the Goods Issue Voucher routine is not so simple as in the case of, say, castings, and the point as to such material being frequently drawn in excess of requirements has been dealt with. In the present connection, no particular point arises for different treatment by the Work Depot unless it is that a distinctive colour of Work Tally may be useful to the foreman while the tally is in his possession prior to drawing the material for same from the Work Depot.

How far it will be right to have material of this character moved from the General Stores to the Work Depot and then from the Work Depot to the shops must depend on relative locations and weight of material. The Work Depot might conduct their part of the routine, by arrangement with the General Stores, without actually receiving the material.

Progressing.

The important feature of the Work Depot routine is to see that the material is ready for the shops and incidentally to relieve the foreman of all clerical work as far as possible.

It would not be necessarily going outside the proper province of the Work Depot if they were to direct the moving of material about up to, say, the first machining operation. There is likely to be a considerable gain of speed in getting material deposited in its right place, if the Work Depot have their own labourers, but it depends on supervision and other factors. One objection may be that the General Stores will not manage with proportionately less staff and so far as this is unavoidable, care must be taken that any extra expense in labourers' wages must be amply recovered by increased output from the shops. So long as increased output can be demonstrated as probable, prejudice ought not to prevent a fair trial, just as slackness on the part of the Management should not allow ineffective overlapping of staff to be tolerated. Matters of this sort are almost outside any general discussion as being dependent on both the local geographical conditions and also local administrative conditions.

As already pointed out the Work Tally is supposed to be sent to the Department Foreman concerned as a notification that the material is lying ready at the Work Depot for issue on presentation of the tally.

If an entry be made by the foreman on the tally as to the machine or operation to which the material is to first proceed, this can be an instruction to the labourer, who lodges the tally at the Work Depot, where to put the material. This information as to first operation can be noted on the tracing coupon and the corner of the coupon can be cut off to show that the material has been drawn.

The question comes in now of the use to which the Work Tally shall be put and the best way seems to have it accompany the work as an identification label and as affording the cross reference to the office or main order number. Beyond that it should serve as a summary of any rejections, thus keeping tally of the number belonging to the batch as it proceeds through the shops. The original batch may be made up to strength by the accession of replacements which, it has been suggested, should be handled up to the point of joining the original batch by a supplementary sub-order bearing the original sub-order reference with a qualifying X before it. The merging of the replacements with the original batch will be noted on the original Work Tally and the replacement tally cancelled.

Work Tallies are sometimes distinctively coloured to indicate urgent or " rush " work. There is one objection, at least, to this course and that is that urgency is not always evident when the material is first issued and moreover on a given order, all the parts **Progressing.** are not equally urgent, inasmuch as some may only involve short operations.

If any scheme of marking work as urgent is adopted it must be treated seriously throughout, and this will mean the exercise of careful judgment. The best compromise seems to be to prepare Work Tallies in the usual way and then for a Progress Clerk, Tracer, Chaser, Worrier—whatever his designation—under the direction of the Works Office to officially mark the tallies referring to the work that has positively become very urgent. A large letter rubber stamp "V.U." will meet the case and it must be understood clearly that this sign must be respected and acted upon.

The basis of this urging action should be arrived at by a knowledge of the components due for completion in a certain week to meet the delivery schedule as worked out in the Works Office—incidentally it may be remarked that due dates should be week ending dates so as to facilitate the rounding up of work in progress—and not delivered to the Work Depot a week before they are required for assembling purposes. This means, in other words, making up a shortage list of components required for assembling purposes a week 5-105. ahead of actual Fitting Shop schedule requirements and concentrating attention accordingly during the week thus available on the components still wanted.

Carried out to its logical conclusion, excessive overtime may be necessary at times to live up to the schedule, but there is little doubt that the driving force of such a scheme under proper administration is enormous. The dangers of scamped work being tolerated by foremen and viewers under such circumstances are not, however, to be lost sight of. Herein lies one of the man-handling problems falling to the Works Manager.

Turning again to the functions of the Work Depot, it is doubtful if the Work Depot can usefully extend its activities actually to the shops beyond perhaps delivering the material to the first operation. It seems better to make the shop foreman responsible for all the further steps up to the delivery to the Work Depot of the finished component, unless an order is suspended, in part or altogether, when the Work Depot should take charge of all the suspended work.

The Work Depot functions largely in the collection or assembling of the finished components for issue to the Fitting Shop for fitting up as assembly units, under Assembly Sub-Orders and later, perhaps, 5-101. will issue the assembly units for final erecting under Erecting Sub- 5 102. Orders.

The Work Depot will draw standard fittings from the General

Progressing. Stores in accordance with assembling requirements and thus save a great deal of work to the Fitting Shop Foreman.

The use of trays and trolleys adapted to the various styles of assembling units is to be strongly recommended. These receptacles should convey the components to the Fitting Shop, possibly remaining there until fitting is completed.

It is particularly desirable that the sets of details for assembly units shall not be issued unless complete in every particular, and further, that the sets shall only be passed out of the Work Depot as the Fitting Shops are ready to start work on them. This will greatly minimise the losses of the smaller details, so likely to occur when the details lie for any length of time in the Fitting Shop. It also prevents general damage and deterioration of finish.

So far no provision has been made for the Machine Shop Foreman to know what work he has in course of machining except by actual survey in the shops unless he makes the assembly lists serve as a record. This means a number of entries, and the inference to be drawn from such a record is not always clear at a glance. Again, while the foreman may be posted well enough by his assembly list, the sectional chargehand requires some other record.

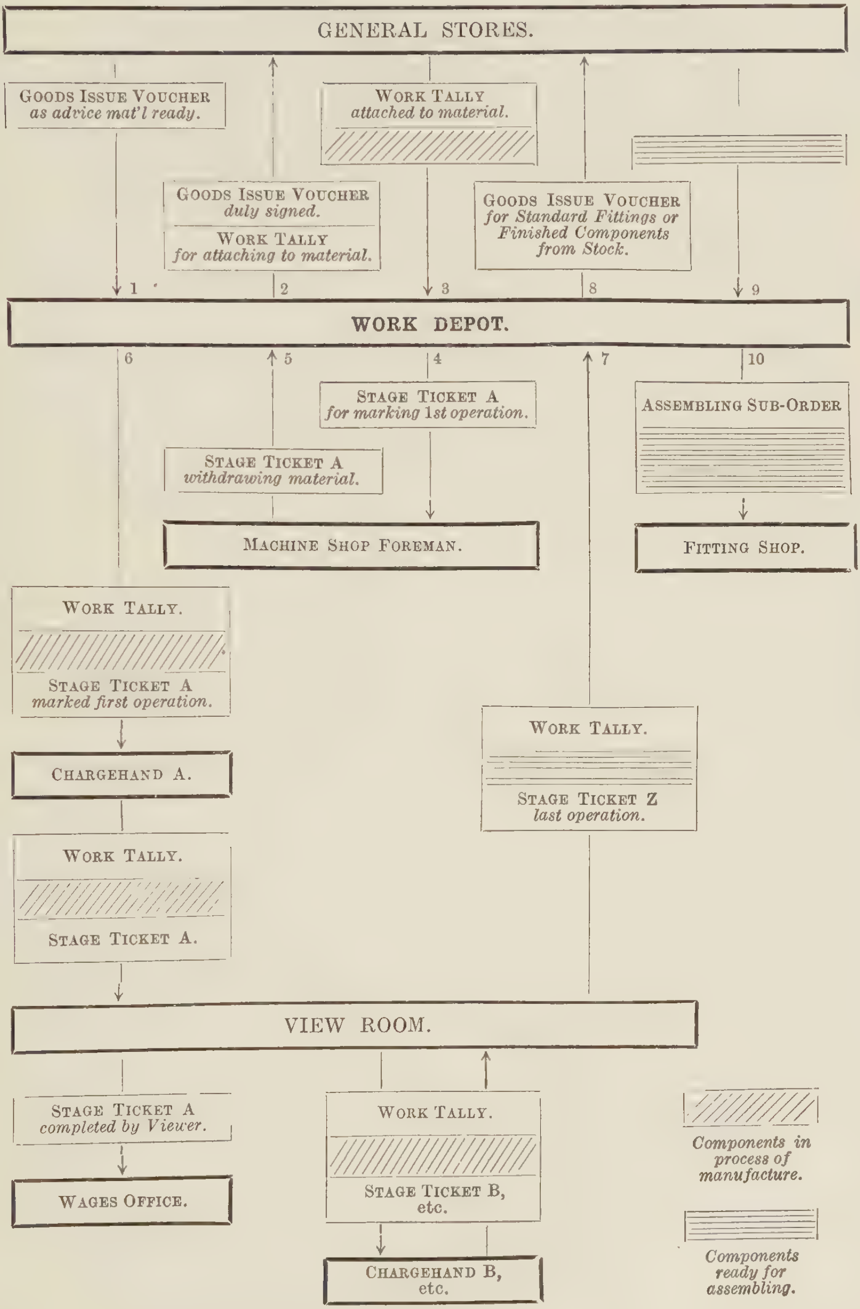
The assembly list may, of course, be re-grouped to suit the various shop sections, but there is little doubt that some sort of delivery ticket for each batch offers the best mechanism for supervising the sequence of the work. Obviously by the tickets remaining with each chargehand he can tell the volume of work before him and he can possibly arrange the tickets tentatively, according to the operators under his charge. Before doing that he should jot down in a Work Book the sub-order references of the batches, as they reach him, entering them on separate sheets according to the office order reference. This enables him to discuss the position, so far as he is concerned, of any given order, with the Foreman or with the Works Manager. Large contracts would have separate Work Books. The Chargehand would probably not enter up the very short jobs that come to him for attention.

By means of the delivery ticket, which may more conveniently
5·97. be designated as a Stage Ticket, it will be possible to provide an effective routine by which viewing and moving of work shall be facilitated, as well as supervision.

The stage ticket for the first operation will be made out as far as possible in the Work Depot, and sent out to the Machine Shop Foreman to notify that material is ready. The foreman will fill in first operation when ready to take out the material. These first operation stage tickets need to be of distinctive crude colouring. They will serve as an instruction to the labourer exactly where to

WORK DEPOT ROUTINE DIAGRAM

Illustrating handling of work up to Assembling Stage.


GENERAL STORES.
Goods Issue Voucher as advice mat'l ready.
Goods Issue Voucher duly signed.
Work Tally for attaching to material.
Work Tally attached to material.
Goods Issue Voucher for Standard Fittings or Finished Components from Stock.
1
2
3
8
9
WORK DEPOT.
6
5
4
7
10
Stage Ticket A for marking 1st operation.
Stage Ticket A withdrawing material.
Machine Shop Foreman.
Assembling Sub-Order
Fitting Shop.
Work Tally.
Stage Ticket A marked first operation.
Chargehand A.
Work Tally.
Stage Ticket A.
Work Tally.
Stage Ticket Z last operation.
VIEW ROOM.
Stage Ticket A completed by Viewer.
Wages Office.
Work Tally.
Stage Ticket B, etc.
Chargehand B, etc.
Components in process of manufacture.
Components ready for assembling.

Progressing. deposit the material—the stage ticket being handed at the same time to the chargehand concerned.

The stage ticket will be collected by the shop viewer—if work is viewed in the shop—or sent by the chargehand with the work to the View Room.

The stage ticket will be completed by the shop viewer, or in the View Room, as a viewing certificate. It may then be passed to the Work Depot for noting as to operation completed and pieces rejected, if any, but in the ordinary way, the Work Depot will not attempt such a record, and consequently the stage ticket, on completion as to viewing, will be put in the Works Post, and thus pass to the Wages Office for attaching to the respective job tickets, for purpose of computing extra pay due.

When inspection is conducted by the chargehand and there is no shop viewer or View Room, the chargehand can complete the stage ticket. Whoever completes the stage tickets for the completed operation will make out a new stage ticket for the next operation. Conceivably viewing may only take place after specific groups of operations, in which event the stage ticket should indicate same, so that the application of the viewing certificate on the stage ticket concerned shall be clear to the Wages Office.

Thus the cycle is repeated until the last operation is reached and delivery is made to the Work Depot. A new stage ticket is not necessary as an instruction for moving the finished components to the Work Depot, this being provided by adding a note at the foot of the stage ticket used for the last operation.

When a sub-order has become very urgent and been stamped " V.U." accordingly, stage tickets of distinctive hue may be usefully adopted to indicate the urgency very plainly to the viewer, the shop labourer (who moves the work to the next operation and possibly works directly under the viewer), the next operator and his chargehand.

In view of the relative importance of the foregoing recommendations anent the Work Depot, the opportunity is taken to make the functions of the Work Depot the subject of a Routine Diagram (see previous page).

Plant. In considering plant in relation to production efficiency the larger questions come under the discussion of Industrial Works Design in Section I.

Certain matters of routine call for mention here, more particularly as to the control of expenditure on works repairs and on works additions. These questions in turn merge into Works Accounts, and in Section IV. reference is made to matters of plant under Standing

Orders, Section IVc, while Section IVk, Buildings and Fixed Plant Valuation, needs to be referred to in its entirety. **Plant.**

There is undoubted difficulty in controlling works expenses when open accounts or standing orders are used by the shops, for the net effect of issuing a list of Standing Orders is to give carte blanche authority, from an accounting point of view, for any amount of expenditure by the shops under each or any of those orders. In practice the foreman's responsibility to the Works Manager means the exercise of some discretion in the amount of expenditure. The Works Manager's criticism, however, is apt to come after the event and if the periodical expenditure follows an even average, no matter if really high, the Works Manager can hardly criticise it since he can hardly have much conception of what it ought to have been as a total for a given period. These remarks apply with special force to works repairs, the expenditure on which is so susceptible to judgment or discretion. The use of individual Plant Sub-Orders is, therefore, 5-96. recommended to cover each repair and also each addition.

The exercise of the necessary control in a large works would presumably be effected through the Plant Engineer, who has general charge of the motive power and other plant. In smaller works the nearest approach to such an official will be the Foreman Millwright, and it is hardly likely that it could be right or expedient to place on him the responsibility for initiating orders for works repairs. Such a course might mean little improvement, if any, over the use of Standing Orders.

Whatever arrangement is made for issuing Plant Orders—it is essential that the control be retained by the Management.

This control may, perhaps, be achieved by the Works Manager authorising all Plant Orders, but if that means only signing them, he will get poor results. Firstly, in any but very small works, he will not always know precisely what he is passing, even supposing he is never forced by pressure of other work to sign without pretending to exercise any judgment. Secondly, if every repair must wait his authorisation the delays may soon force him to drop this method of attempted control.

The Works Manager's best remedy in practice seems to be to decide on a centralising point in the Works, not in the offices, where Plant Orders can be issued on some predetermined plan.

The method of requisitioning for a Plant Order to be issued may be by an Internal Memorandum or perhaps a specially printed 5-106. requisition form, according to circumstances.

Some conscientious person must be selected who is capable of investigating the extent of the proposed repair and is qualified to make up or obtain a fairly near estimate of the cost. It is desirable

Plant. he should not have the actual carrying out of the repairs himself as that would vitiate his disinterested attitude. Possibly the Tool Store Chargehand if not responsible for more practical work than the sharpening of tools, may be a suitable person. In other cases, the Ratefixer may have the time and certainly should have all the necessary qualifications.

The point is that the Works Manager shall select some one of the staff who is accessible at all factory hours, and put on him the responsibility of issuing Plant Orders, subject to the reference to the Works Manager of all orders likely to cost more than a certain amount, or as he may instruct. If this deputy has a reasonable amount of discretion no difficulty should arise over very urgent repairs. Generally the Works Manager will wish to be fetched to see these special cases so that even then his authorisation may be obtainable before work is started.

The deputy should be required to keep a record of the estimated cost of each order issued and to report the total each week to the Works Manager. This will afford the means, not easily obtainable any other way, of regularising the expenditure in accordance with the activity in the factory.

It is almost a necessary condition of effective control to issue a Quantity Slip for each Plant Order restricting the materials that may be drawn for each job. The knowledge this involves is necessary for estimating and possibly for requisitioning purposes, so that no extra investigation is necessary to achieve this end.

When trade falls off it is the usual thing for the repair expenditure to be cut down as the first move in reducing expenses. It is not difficult to do this, however uneconomical it may prove in the long run, by delaying the proverbial stitch in time that will save nine.

There is no avoiding the necessity of reducing repair expenses in slack times, except for special cases of extensive overhaul approved by the Directors. It therefore behoves the Works Manager to use such means of controlling his repair expenses as shall enable him to
5-65. trim his sails without unnecessary loss of efficiency. If he knows that all his repair expenditure is well spent on economical repairs and not boosted up by idle or semi-idle time booked for convenience against repairs—one common result of open orders in the shop—or by unprofitable repairs of a patching-up nature, when only an overhaul will meet the case, then he should not hesitate to maintain his repair expenditure at a proportionate level when the shops are busy and there is the output to pay for it.

The difficulty will be that repairs may absorb the use of machinery urgently wanted for production purposes, and this must be met by

Plant.

consideration of whether the interests of output are served by loss or risk of loss of efficiency in the machines requiring attention.

It is suggested that the above-mentioned channel of control be used for Works Additions, subject, of course, to the Works Manager's limits of authority in the matter and apart from purchases of plant directly requisitioned by the Works Manager.

By keeping tally week by week of all expenditure on Works Additions, both in the factory and by purchase outside, and exercising continuous care in the matter himself and through his deputy, the Works Manager will know how he stands and may know better when to apply for plant additions to be sanctioned.

One result of the common difficulty of getting plant additions and renewals sanctioned that involve purchasing, is that it is easier for the Works Manager to spend money inside the Works than to get permission to buy plant outside. In consequence of this, and against his own judgment, the Works Manager is frequently compelled to waste money patching up and using inefficient machinery.

This question of inefficient machinery is very important and frequently has too little consideration. The taking of long views would assuredly curtail the purchase of second-hand machinery, a practice so beloved of some types of management—of commercial rather than works management, let it be said.

All old machines are not necessarily obsolete and all new machines are not necessarily efficient. The matter is one of the many in works management calling for a discriminating judgment, based on a proper understanding of machine efficiency—considered always in relation to local conditions.

Leaving on one side the question of machine selection as more appropriate to works design, a passing reference may be made to the bearing that arrangement of machines and of workers generally may have on the production efficiency of any department. Facilities for re-arrangement, particularly as to having interchangeable counter-shafting, ought to be kept in view from the start. There are, too, a great many machines that do not need to be secured to the foundations if really good floors are provided, so that plant re-arrangements in a small way at least do not necessarily entail waste of money and when carried out with foresight may produce considerable economics.

There are shops with all the machines driven off the shafting without the intervention of counter-shafting. In some cases, machines are fitted up for different operations and tried in a special department and transferred bodily to the manufacturing department, thus carrying the interchangeable idea a stage further.

There are more than enough shops where each additional machine

Plant. seems to have taken whatever vacant space there might be, often with special expenditure in the way of drive and installation, with an ultimate atrocious conglomeration of machines—all arising from want of facilities or want of courage to rearrange the machines as additions may call for. Obviously these are questions where adequate experience may bring to bear a very valuable criticism of the initial lay-out and save much needless expense in future developments.

The outline plans drawn to scale on card or stiff paper, as used for arranging a machine shop lay-out on paper, can very well be kept attached to the Plant Record Card when not in use.

5·64. The Plant Record Card is intended to be quite separate from the Buildings and Fixed Plant Register kept in the Works Accounts Office for recording book values.

Plant Record Cards are required by the Works Manager for reference under departments and classes of plant. The cards should be headed by the Works Accounts Office in the terms of the invoices for their purchase and supplemented by a technical assistant as to the particulars given on the specification and of measurements and notes from the machine itself. The idea is that the Plant Record Cards shall constitute a complete inventory of the respective machines in terms allowing for their proper valuation, and further for a duplicate set to serve adequately the needs of the Ratefixing Department. It might be possible for the latter set to be sufficient for the Works Manager's reference also without any duplication.

Attachments and accessories associated with any machine should be included in the inventory, and therefore noted on the record cards, though, as discussed elsewhere, they may not be always included in the fixed plant value.

The Plant Record Card should give the inventory value whenever actual valuation of Buildings and Fixed Plant is carried through by the Works as discussed under that heading further on.

The point is raised there as to giving reference numbers to the plant items, and definite suggestions are made on that point in connection with a classification scheme for Buildings and Fixed Plant.

The main problems of power supply and efficiency are also discussed in Section I.

Good results can sometimes be obtained in fuel economy by a suitably based bonus scheme for the stokers, unless economy is assured beyond doubt by automatic mechanical methods.

5·106. It is desirable to have Plant Stoppage Reports whenever production is interrupted on account of plant failures. These should emanate from the foreman of the department in which the stoppage occurs, and be made out in triplicate so that one copy can go to the

Works Manager and one to the party responsible for issuing a Plant Order for remedying the fault. This more formal routine is not intended to prevent rapid action or verbal instruction but rather to ensure that every stoppage is investigated—with a view to preventing its recurrence—and to meet the cost accounting requirements properly. **Plant.**

Belting troubles may come under this routine with considerable advantage as leading to much greater efficiency. The Plant Stoppage Report could in those cases go direct to the Beltman in lieu of a Plant Order.

Just as every trifling accident to workmen will not justify an Accident Report so every trifling stoppage of machine will not require a Plant Stoppage Report.

Tools. The subject of tools in relation to production efficiency resolves itself into two divisions, viz., tool provision and tool control.

It will be easily appreciated that by tools is meant the loose equipment necessary to the operations of production. They comprise the tools of the hand-worker equally with the machine-worker, and while it might be correct to describe the former as hand tools it would not do to describe the latter as machine tools, but rather as machining tools.

Machine tool signifies the machine itself used for performing formative operations on the work by means of tools, thus, a drilling machine is a machine tool utilising a drill as the operative tool, with probably the aid of accessory tools in the form of jigs or fixings for holding the work. A jig is primarily a device for ensuring the interchangeability of the work done, though it may be termed a jig when its usefulness only extends to facilitating the holding of the work relative to the tool. This definition is put in here by way of explaining the references made elsewhere to " Jigs and Special Tools." It will be convenient for the purpose of discussion to consider loose equipment peculiar to the production of particular components as special and therefore " non-standard " in contradistinction to tools that have a more general application and may, therefore, be called " standard."

It is not altogether necessary that in any given Works " standard " tools shall conform to any other than a purely local standard. The distinction might be, perhaps, better conveyed by the terms "special" and " ordinary," though the principle of standardisation ought to be kept always in view. The importance of this consideration lies in the fact that standard tools ought to produce standard dimensions, speaking always in the local sense.

In some works, for instance, any tap once made is held to be a standard tool, and screw threads of the particular dimensions are supposed

Tools.

to be thereafter standard screw threads. This is unsound practice as leading to the perpetuation of numerous odd sizes and deliberately handicapping the future necessities of tool provision.

It is highly important that standardisation of design shall be developed on lines at least favourable to the standardisation of tools. In the case of mass production the consideration may be less important in that the supply of tools may have to be on such a scale as to create in themselves an obvious local standard. In that case, too, less weight needs to be given to the possibilities of buying tools ready-made—a practice that the high quality of tools now on the market very properly encourages, to the mutual advantage of both parties.

The most important stage in the development of the tool organisation of any Works is the preparation of a standard tool list, and this must be agreed with the Drawing Office if it is to be really effective. It must be possible to add to the list as occasion arises.

Assuming such a reference list, tables can be prepared for Drawing Office use showing the range of dimensions accepted as standard. It is more important to aim at adopting a table of sizes in accordance with existing tools—sizes thus confirmed as having local application—rather than setting out to acquire a tool equipment adequate to cover a range of sizes that may never be brought into use completely.

When the design of a component is in the final " pencil " stage, much advantage to production might result from conference between the Chief Designer and the Tool Designer—for it is not likely that the experience necessary to the latter can be combined with ordinary designing. Whether in the pencil stage or in the photo print stage, all designs must come under review by some suitable person for the purpose of settling what jigs and special tools must be put in hand.

At this point the manufacturing policy must bear fruit and guide the amount of expenditure appropriate to each case. There may be little or no option as to much of the expenditure if the component is to be made even approximately interchangeable, while only mass production could justify the recognition of every possibility in the way of reducing operation costs.

The exercise of this judgment is largely the expression of efficient Works management, but the task is commonly no light one. The Works Manager may be expected to achieve his end through the medium of the Tool Designer, though the Ratefixer, in a given case, might have the better qualifications for exercising discretion. In some works the responsibility is put wholly, or nearly so, on the Departmental Foreman. This may be right in certain cases, even to the extent of letting the foremen design the jigs and tools, but generally speaking, the right line to take is to utilise the services of a specialist and rely on obtaining a high average efficiency by virtue of his special knowledge and opportunities. This high average may be a more satisfactory net result than occasional exceptional performances by foremen, who have so many calls on their time, that prolonged concentration on one aspect of the shop management, as summed up in tool designing is hardly possible for them, or, altogether desirable, if it were possible. **Tools.**

Apart from the provision of jigs and cutting tools, consideration needs to be given to the gauges necessary to ensure adherence to dimensions. Following from this, the adoption of a system of limits on the lines discussed elsewhere has an important bearing on the special provision necessary, and the whole question of standardisation of dimensions will be seen to affect expenditure in various directions.

Where the tooling equipment is at all important in relation to production efficiency, it may be taken as sound practice to draw up a Tools Provided List as early as possible after the issue of each 5-58- drawing to the Works. This list must needs take cognisance of the sequence of operations and therein is apt to lie a stumbling block if the foreman is not the sponsor for this sequence.

It can be argued that improvement in shop practice is prevented by fixing the sequence of operations, but against that must be set the fact that proficiency usually comes from practice, which continual variation of operation sequence puts out of the question. Obviously, considerable knowledge is required, if these operation sequences are to be drawn up to better purpose than the chance decision of the shops.

Although actual tool design is not the province of the Ratefixer, he is certainly likely to be the best man to draw up Tools Provided Lists. It should not be outside his knowledge to indicate where standard tools apply and the type of jigs, special tools and gauges required.

The formality of the routine, necessitating as it does a notification of the tools contemplated, to the foreman concerned with the ultimate use of the tools, and an instruction to the Tool Designer to design the same, can be made a cause of delay and trouble if there is not proper co-operation between all parties.

The difficulty that is apt to arise when decisions have to be written down is the implied necessity for having convictions as to what is right and taking the trouble to put them into words. The natural tendency to procrastinate may make the routine referred to seem irksome, but there is no gainsaying that the provision of tools should precede the taking up of the job in the shops, and there can be

Tools. no effective organisation when this matter is left for haphazard treatment.

In view of the heavy clerical work necessitated by detailing each operation on the Tools Provided List, it may be sufficient to indicate the processes, *e.g.* Forging, Turning, Milling, Drilling. These lists may be attached to the shop drawings, if the drawings are arranged in unit form for each component. As the special tools are made, entry can be made on the Tools Provided List of the date and tool reference. The entries may be facilitated by having delivery tickets,
5-94. called possibly Completed Tool Advices, to accompany each new tool sent from the Tool Room to the Tool Stores for issue to the shops.

The following illustration of an operation sequence is arranged to show the alternative abbreviation if the process, instead of the operation, is named:

GEAR WHEEL.

	Operation.	Process.
1	*Turn Bore and Ream (1st setting)*	Turning.
2	*Turn Back and Bevel (2nd setting)*	
3	*Finish Back Face (3rd setting)*	
4	*Castellate*	Milling.
5	*Grinding (soft)*	Grinding.
6	*Drilling*	Drilling.
7	*Rough Cut Teeth*	Gearcutting.
8	*Finish ,, ,,*	
9	*Broaching*	Broaching.
10	*Frazing*	Filing.
11	*Carbonising*	Case-hardening.
12	*Hardening*	
13	*Grinding Hole*	Grinding.
14	*,, Face*	
15	*,, Groove*	

Tool Room, it may be remarked, is a common designation for the Tool Making Department and should be quite separate from the Tool Stores.

A point may be made as to marking all jigs and special tools with the respective part number and operation for which intended.

The method of putting new jigs and special tools in hand may very well be for the tool drawing, when issued to the Works Office, to
5-59. be made the subject of a Tool Sub-Order from that point.

The necessity for having a proper record of all jigs and special tools will be readily appreciated, and this record may be on Jig and Special Tool Record Cards kept by the Tool Stores Chargehand. The record could even be secured by merely pasting the special Tool Advice, referred to above, to a blank card, sufficiently larger in size to allow of any notes being added as to alterations or applications to other part numbers.

The procedure necessary for maintaining the stock of standard tools may be possibly centred in the Tool Stores Chargehand with the idea that he shall make out Purchase Requisitions and Tool Orders under instructions from the Works Manager. **Tools.** 5-91.

Coming to the question of tool control, the responsibility for keeping all tools in good order can best be vested in the Tool Stores Chargehand, and he may, with great advantage, have under his immediate charge sufficient grinding equipment to sharpen the bulk of the tools as received back from the shops. He needs, of course, reference gauges and measuring appliances with a view to methodical checking of tool sizes. This checking ought to be done at intervals suited to the class of tool and, in this connection, gauges will be the most important class.

There is much to be said for the practice of using gauges that are adjustable within small limits, and the risk of misuse in the shops, by reason of the workmen altering the gauges, should be met by having separate gauges for inspection purposes. The checking of gauges by the Tool Stores Chargehand must not be a perfunctory matter under any circumstances, and less so when the gauges are susceptible to adjustment.

So far as the organisation of the Tool Stores is concerned, much depends on the actual storage of the tools. Particulars of various excellent methods have been widely published, and it would, in any case, be attempting too much here to discuss these details beyond emphasising the imperative need for having a place for every tool, making the absence of any tool obvious. It would often be an advantage to hold the reserve supply of tools, that is, those in excess of current demand, separately from the Tool Stores.

The system adopted of checking tools in and out on loan to the men is usually that of brass checks bearing the man's check number. These are sometimes lent, in some uniform quantity, to each workman on starting, and he lodges a check for each tool borrowed, and these are hung or deposited against the place left vacant by the tool. Sometimes boards with the sizes of tools marked on are provided for this purpose.

This method does not quite meet all requirements, as it is not made clear what tools each man has on loan—a matter of some urgency when he is leaving.

Incidentally it may be mentioned that, when men are leaving, or are suspended, the Tool Stores Chargehand should be advised by means of a Tool Clearance Ticket, which the man will require duly certified before he can draw his wages. 5-21.

Some trouble often arises with men leaving their tool checks at home or losing them. This difficulty is avoided if the tool checks are kept within the Tool Store, the ones not in use being hung on a suitable board under the man's check number. This means that the

Tools. man must abide by the Tool Stores records without being furnished with proof that he either had received or returned the borrowed tool.

The supplementary information as to the tools borrowed by any one man may be furnished by having a tin label in check or disc form, with a description of each tool stamped thereon and kept with the tool until borrowed. When borrowed, the tin label is put on the hook carrying the man's tool checks, and a tool check put in the place of the tool.

Probably the best compromise is for workmen to give written Tool 5-91. Loan Slips for any tool required on loan and for the Tool Stores to hold all the tool checks. When a tool is borrowed the numbered tool check is put in its place and the slip is filed in a card tray or cabinet under the man's number. When the tool is required the man gets back his Tool Loan Slip and there can be no dispute. The collection of tool slips lying in the Tool Stores furnishes a most convenient means for rounding up tools not returned at the proper time. If need be the loan can be confirmed from week to week by actual observation when return to the Tool Stores might be inconvenient, such as in the case of tools set up in a machine.

Otherwise, a strict ruling is necessary to ensure all tools being returned to the Tool Stores each week-end. The Tool Loan Slips for such returns can be held by the man and utilised on the following Monday morning. The practice of one man lending Tool Stores tools to any other man must be discouraged as breaking down the effectiveness of the Tool Store control.

There is a certain number of tools, varying according to the work, that are almost necessarily on permanent loan to the men, such for instance as hammers, and it would be absurd to call these in every 5-92. week. The course advised is to provide each man with a Tool Book. In this book the Foreman will authorise the tools that are required on permanent loan, and when issued these tools will be entered upon a suitable sheet in the Tool Stores against the man's number and analysed under the various kinds of tools. This permanent loan account will have to be settled when the man leaves or is transferred to a different department. Round about the annual stocktaking in particular, the tools in the workmen's possession can be agreed with the Tool Book. Files can come in this category of tools as permanent loan though constantly being replenished. Tool Slips can be utilised for replenishments when accompanied by a worn-out file, without necessitating a fresh entry in the Tool Book.

A method of controlling the issue of files and other consumable supplies is mentioned under the heading of Materials, where the suggestion is made that the Tool Stores should be the distributing centre for shop supplies so far as practicable. Padlocks and keys for tool drawers and cabinets may be amongst the tools on permanent loan. **Tools.**

In the matter of measuring instruments such as micrometers, a rule may be made as to their return to store each night. Here again the Tool Loan Slip facilitates seeing this routine through by allowing such tickets to be put on a special board to be cleared shortly before closing time.

Obviously, too, a Tool Store messenger when collecting any tools, by having the Tool Loan Slip in question with him, can exchange the ticket for the tool on the spot—but only if he is qualified to verify that the tool is in good order.

The examination of the tools, as returned, to see whether there has been breakage or misuse is very important. A Record of Tools 5·93. broken and lost is necessary, and much good may be done in inculcating habits of carefulness if action is taken. The fairest ruling is perhaps that half the cost of tools lost or broken through carelessness will be deducted from any extra pay otherwise due. Such a rule must be effectively notified to every man concerned before any deduction is made. A reasonable application of the rule will be to deduct in respect to all losses, and to pick out each fortnight a few of the worst offenders as regards breakages. It is not feasible or policy to carry out the ruling too harshly, but when moderately, though strongly, administered, marked economy may result. The records should be made up for several weeks before inflicting any penalties, as the saving that can be demonstrated later will be proof of preventable carelessness in the earlier period.

Various references have been made to the possible functions of the Ratefixer, and it will be in keeping with these suggestions to cover a rather wide field by the term Ratefixing. **Ratefixing.**

Considered in its elementary sense ratefixing is the fixing of piece rates or prices, in the case of a piecework system, and time limits in the case of a premium system.

The recognition of ratefixing, as an art distinct from foremanship, dates practically from the use of high speed steel with the consequent development of the premium system about 1900. On the Tyne, at least, these matters received considerable attention earlier still. The ratefixing specialist is more rarely associated with the piecework system, though if he is necessary in the one case he is in the other.

The principle of accurate ratefixing is not always embodied in practice, and powers of a far-reaching character may get vested in ill-qualified men. When the Works is large enough to require a staff of ratefixers, the main need will be to have the right calibre departmental head. In a smaller works it may be better to divide

Ratefixing.

the risks of wrong staff selection by dividing the work, and having each ratefixer responsible directly to the Works Manager.

Given a man of adequate practical ability and a proper spirit of keenness and loyalty, eminently satisfactory results may be achieved by letting him work out his own salvation as a ratefixer. It is, of course, to be assumed that the routine for collecting job data (that is times taken on operations and quantities correctly finished) is established beyond interference, and that the business of the Ratefixer is to apply this data and not collect it. The point to be made here is that if the job data is not collected accurately—and the difficulties of doing so are very real—then the Ratefixer must only work from actual observations.

To a very large extent no amount of ordinary job data will take the place of observation. The logical development of observation is what is called motion study, that is the study or criticism of all the motions associated with a certain operation, as to whether they may not be more efficiently exercised. Some American investigators have achieved astounding increases in production efficiency by the proper direction of the workers' energies—notably where manual labour has been involved. The cinema is being applied to motion study.

With skilled labour and the more ordinary workshop conditions, the reasonable attitude towards such matters is to practice time study rather than motion study. Time study is a question of the time necessary to perform the various operations and involves the co-relation of observation and job data, as to what is possible. It is eminently desirable and almost imperative that the ratefixer shall have sufficient practical experience and sense to be able to direct the operators himself to prove the feasibility of the rates allowed.

It is in regard to time study that the Ratefixer requires to devote so large a portion of his time. It is not enough to fix rates that correspond with some other jobs, for that is probably building on a false basis and therein lies the great danger when foremen undertake ratefixing amongst their various duties—a common enough practice under piecework systems. The essential requirement is to arrive at a proper knowledge of what is possible—a position that previous performances may throw very little useful light on.

The factors contributing to better shop performances are not summed up in feeds and speeds, although this is the main province of the Ratefixer's activities. A Ratefixer should be able to detect at a glance if the proper speeds and feeds are in use on the machines he is constantly dealing with, other than in the case of drills and tools which run at speeds which the eye cannot follow.

There are other considerations to be borne in mind, such as

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alternative processes to those in regular use, *e.g.*, milling instead of shaping, or drilling instead of boring, and there is the larger question of jigs and special tools, their provision and design. There is a risk in these things that the jig, fixing or cutting tool may not be designed correctly, and sometimes that the design may not have been carried out faithfully enough to give the intended result. The influence of seemingly trivial points, such as cutting angle of tool, the spacing of the cutting teeth in relation to the work to be done, the rigidity of the main parts under stress during the operations, the volume of the stream of lubricant, all or any of these may easily increase the output from a machine even to the extent of doubling it.

Other factors are the regular supply of work, the absence of interruptions during the course of an operation on a batch of components, the service of tools and drawings, and the conditions of shop lighting and comfort.

The very enumeration of these various factors in production accomplishments strongly support the necessity of stimulating endeavour so as to get an adequate return for the forethought given and facilities provided. Further, the only equitable basis in the majority of cases will be seen to be the premium system, whereby the savings in the time taken on operations are shared between the employer and employee.

The fact that there is a mutual interest under the premium system makes it feasible for the Management to adhere to rates once fixed, a most vital condition of permanent efficiency, whereas such a position is hardly tenable under a piecework system—seeing that all the saving in operation time goes to the man. As mentioned previously, rates may have to be altered in the event of a radical change of method, whether under premium or piecework system.

All managements are not equally honourable in this matter of rate adjustment. Their keenness to secure the maximum benefit to the employer makes them object to high earnings by the men, and rates are cut without adequate justification from the men's point of view. This course is to the detriment of all employers by destroying all confidence on the part of the men.

Collective bargaining, by which rates for the different jobs are fixed in conference between shop representatives or delegates and the management, offers one way out of the difficulty, but at the cost of considerable delay in the administrative routine.

The best method and perhaps the only strictly fair one is to publish the time limits as standard for the respective operations. Publication may be effected on the shop prints—possibly by inclusion on the Tools Provided List.

Publication in this way commits the Management to time limits

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that may, in cases, be somewhat high, but after all the division of gains incidental to the premium system sees to that sufficiently, and no system will permanently continue if it operates too harshly or assumes too little imperfection in the worker.

There is nothing to prevent the publication of these standard times as reference times for criticising the performances under a daywork system, and maybe the shortsighted objection of trade unions to the premium system may bring about that position—the worker having no chance of earning extra pay, and yet held up to a high standard of output.

Ratefixing is more commonly restricted to machining and fitting operations on the saleable products of the Works, to the exclusion of other classes of work and other processes. There are trade unions which will not allow their members to work under the premium system and some repudiate piecework as well.

In the case of tool making and millwrighting, neither the premium nor piecework system is often applied, though this is a field affording much scope for reducing costs. Special judgment is necessary in fixing time limits for work of such varied character.

Work that is not done under premium or piecework systems must needs be done daywork, the wages being paid without reference to the work turned out.

The argument is sometimes advanced that piecework means scamped work at a low cost, and that daywork means good work at a high cost. It is not so certain that daywork always means good work unless there is adequate inspection, but admittedly less inspection is likely to be necessary as compared with a system where the workers have any stimulus towards greater exertions, in the form of extra pay.

Local conditions must decide if the extra cost of inspection is to be held as a bar to the adoption of a premium system, for in the premium system the basis of award is less likely to tempt a man to scamp his work, because it is an accepted condition of the premium system that day wages shall be guaranteed. Under a piecework system where day wages are guaranteed, as they have to be in the engineering trades, the risk of scamped work will not be high, because of the system of extra pay, but rather because of faulty administration, more probably in the direction of inadequate inspection.

Under a daywork system the saving in cost of inspection is likely to be off-set by increased cost of supervision. If production efficiency is to be attained the supervision requires to be backed up by the assistance that can be afforded by a man with exactly the experience and qualifications of a ratefixer.

The necessity for the Ratefixer arises from the complexity of shop conditions and the incessant variation of jobs outside the very restricted field of mass production. It is only by concentration on the subject coupled with time study as already mentioned, and the critical application of job data, that any high efficiency can be attained. Once the Ratefixer has got a proper grip of the possibilities of each machine and worker, and has by actual observation arrived at rates for certain typical items of product, he is in a position to apply his judgment rapidly to new jobs. **Ratefixing.**

It is desirable to have tables prepared showing the available feeds and speeds on each machine, and these tables can be blue-printed for mounting on a card and hanging near the respective machines. Each Plant Record Card, as mentioned previously, can carry a copy of the table.

A point of considerable importance in most shops is to differentiate between the time limits for small batches and those for large batches of the same article. If the quantities fluctuate, it is obviously not fair to either side if the time limit per piece is identical for any quantity. The point has special application when there is a sincere attempt on the part of the Management to avoid interference with time limits once issued, except for radical changes in methods.

The logical solution of the problem is to fix a starting or preparation allowance on each batch, and then to have an operating time limit accordingly for each piece—thus

Total Time Limit = Preparation Allowance + (operating time limit × number of pieces finished).

This puts the matter on a proper footing whether the batch consists of two or two hundred pieces. It will have the effect of showing up uneconomical batching.

With the time limit divided as recommended, the worker will be fairly treated if only a small batch is in question and the employer will be fairly treated if there is continuous run of work—the preparation allowance only applying when the job is started, and not to successive batches unless there has to be a fresh start for each batch. This arrangement confers the great advantage that the making of small batches to facilitate the regulation of the work in progress need not necessarily affect the production efficiency in point of wages cost of output adversely.

The authorised interruption of any operation on any batch will quite reasonably justify granting the preparation allowance when the job is re-started. The Weekly Time Allocation Sheet will serve 5-28. to indicate to the Wages Office the continuity of batches, coming as they will under separate sub-orders.

The estimating of preparation allowances is a matter of observation according to the job to be done, and there may need to be some

Ratefixing. discrimination in respect to the machine to be used. The time necessary for obtaining materials, drawings and tools is a matter of shop service efficiency and must be included in the preparation allowance.

There is no denying that there enters into ratefixing a considerable element of approximation and personal judgment. The actual cutting time may be computed with fair accuracy, but the time added to cover the incidental work on each operation is not readily amenable to any close calculation, unless maybe investigations actually extend to motion study. The approximations can, however, be so much the closer if the influence of quantity can be entirely ignored.

In the case of the Machine Shop, and other shops in a different degree, the factors entering into the make-up of the preparation allowance are briefly as follows :

Taking instructions from Chargehand.
(Material is to be understood as already at machine, and further that Chargehand has obtained necessary drawings in advance.)
Obtaining Tools (Fixing, Cutting and Gauging).
Preparing machine and setting up tools.
Restoring machine to normal condition and returning drawings and tools—at end of job.

The factors comprising the operating time per piece are approximately as follows :

1. Cutting Time.
2. Securing and setting work in machine (including crane service if necessary).
3. Changing Tools as necessary (allow for grinding if not done in Tool Stores).
4. Starting cut and sizing ; also allow for returning the tool to the starting place or any other place required.
   (Sometimes averaged at 25 per cent. of cutting time.
5. Gauging.
6. Minimum Rest or Relaxation (sometimes taken at 5 per cent. to 12½ per cent. of net working time—items 1, 2, 3, 4 and 5).

5-60. Having arrived at a close estimate of the possible operating time, a margin of 50 per cent. is added thereto to give the operating time limit. Similarly with regard to the preparation allowance.

This fifty per cent. margin is arrived at by assuming that, if the man does the job within the estimated time, as a reasonably good man should be able to, he will, by being paid one-half of the time saved, have earned a bonus or premium of 25 per cent. on his time wages. This position holds good for both the Halsey-Weir and Rowan systems on that particular proportion of saving.

In the matter of a piece-work price, this can be evolved by the same method, with the difference that a margin of only 25 per cent. would have to be added to the estimated time, seeing that all the saving goes to the man.

A further factor in this connection is provision for contingencies, such as unexpected tooling difficulties. The best course here is to make this provision by adjustments of time in each instance, as and when necessitated—building the time limit as for straightforward

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work. The proper authorisation of these adjustments calls for the Ratefixer being in continuous touch with the shops, even where limits have been all settled. The Works Manager may require the Ratefixer to furnish a daily report of all adjustments made.

Rules have already been suggested for dealing with defective material, as this obviously calls for adjustments.

The effect of all time adjustments should be to reduce the time counted and should not, as an alternative, be added to the time limit. This avoids disturbance of standard time limits and avoids introducing a different basis for computing the premium due—a point of importance under the Rowan system only. Other adjustments of time counted will occur when juniors are associated with mechanics and suggestions as to the lines to be followed have been given under Works Regulations (Section III a).

There is the further case to be considered of adjusting time when time limits are fixed for single machines and the work given to a man operating several machines. The compromise suggested elsewhere is to allow two thirds of the single machine time limit for each of two machines under the one operator, and to allow one half this time limit for each of three or more machines. It will be observed that this contingency is to be met by adjusting the time limit, and may be treated as the one exception to the rule recommended above, that time adjustments should apply to the time counted.

The question of fixing time limits before the operation is started raises various points of interest.

In abstract theory, at least, a man ought to know his time limit before he starts on the job in question. In practice there is the difficulty first, that if time limits are fixed ahead of the shop requirements, it may be found that the operation is carried out differently from what was assumed, and further, that the Ratefixer's judgment, when he has not the advantage of seeing the work in process of being handled, may occasionally prove at fault. On the other hand, if the time limit is not to be fixed until the extent of the operation is beyond alteration, this means that each job is actually started before the Ratefixer attempts to deal with the time limit. These are the more ordinary conditions, and not infrequently the job is watched for a time to see how matters are going before the Ratefixer is prepared to fix a time limit.

The method sometimes adopted is to fix a tentative limit and to only adopt it as established when found satisfactory.

Some managers will argue that every job ought to be done daywork at the first time of asking, and that the time limit should be settled from that experience, modified as judgment may dictate.

Ratefixing. This is the old way of a man virtually fixing his piece price by doing one of a batch by way of trial.

In mass production, where any operation may be repeated an enormous number of times, there is no doubt that the time limits in question ought to be settled before the manufacturing departments take up the respective jobs. This is a development that attaches to a Tool Room and is hardly within the category of ordinary ratefixing. The idea of actually setting up the manufacturing machine itself in the Tool Room and transferring it bodily, when everything is ready, to its appointed place in the manufacturing departments, lends itself to the best results in this as also in the direction of tooling efficiency.

Under most workshop conditions repetition is of a very limited nature, and in any case, the multitude of operations to be dealt with make it dangerous to adopt either too heroic or too cautious a method.

It may be better to have fixed a wrong time limit than not to have fixed one at all, as under reasonably efficient administration no flagrant errors in time limits need occur. The argument sometimes advanced in favour of the Rowan percentage plan of computing premiums, as previously described, is that large errors in time limits are not unduly serious in their effect, owing to the operation of what is virtually a sliding scale. While there is a good deal of force in this argument as to adopting the Rowan plan in favour of the Halsey-Weir plan, it does not justify inefficient ratefixing. From the point of view of inducement, a time limit should err on the high side, and this is the effect of the method already mentioned for building up the time limit. If, however, time limits are so much wrong on the high side as to require the saving grace of the Rowan plan then there will be some limits unduly on the low side, with a consequent loss of economy in results for lack of sufficient inducement.

The safeguards against ill judged time limits lie firstly in the accuracy of the job data and secondly in the thoroughness with which the job data is interpreted and made useful as guides to later practice.

The main essential for interpreting job data is to have the drawings available, and the possibilities in this direction, from having drawings in unit component form, are considerable. Such drawings would be classified under some such scheme as mentioned under Drawings, Specifications and Patterns. There might be attached to each print, as filed in the Ratefixing Department, a list of operations and time limits (preparation allowances and operating times).

Turning again to the question of fixing time limits in advance, this means, first and foremost, the fixing of the operations as to their respective extent and sequence. This involves a fore-knowledge or assumption of the class of machine to be used. The variations possible in operation extent and sequence are often astonishing. This arises partly from the common hand-to-mouth methods of dealing with the work in progress and partly from the inevitable limitations in any shop's equipment, necessitating the use of machines available rather that those best fitted for the work.

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When adequate consideration is given to the incidence of shop charges on individual producing units, whether machine or hand, it will be realised that there are possibilities of appreciable saving in production costs by using only the class of machine economically best suited to each operation.

It is an entirely appropriate function for the Ratefixer to weigh up all the factors that enter into production efficiency, and there is little question that the planning of operations in advance is a move in the right direction, apart from the possibilities it affords of fixing time limits in advance.

The general sequence of processes has to be assumed beforehand in drawing up a Tools Provided List so that this matter has to be viewed as bearing on various aspects of production efficiency.

It may be argued that operation sequences are, or ought to be, improved on each time the job comes through. This argument assumes firstly that sufficient consideration will be given to each case to achieve an improved sequence and secondly that, failing such consideration, there is not equal liability of any change of sequence proving a change for the worse. Variations in operation sequence, however well founded, destroy the comparative value of job data and hinder, therefore, development in the use of same. It is a rare case where counsel cannot argue for each side, and the whole matter must be decided on broad lines of practicability.

The serious objection to the laying down of operation sequences in advance is not that it stifles improvement but rather that it sets up a standard of working that re-acts on the whole administration of the shops, and not every administration is strenuous enough to achieve planned results day after day. A parallel can almost be drawn from the training of an athlete. There may be room for disagreement, as to the training methods adopted, but in any case he voluntarily puts himself under restraint to follow certain rules, and in the result he may be expected to achieve much more than the untrained man. The risks of overtraining are not usually advanced to discount the value of all training.

The so-called Scientific Management, of which operation planning is a typical expression, and possibly the most far-reaching, may be likened to this athletic training, except that in works management

Ratefixing. every day is a race day. Without unduly pursuing the simile it may be said that the victory is likely to be with the fit, and the restraint on personal inclination, resulting from the necessity of keeping fit, ought not to constitute oppression, such as the term scientific management seems to spell to some minds. In any event the pace will depend on the individuals, aided to such extent as may be by training, so it may be said that truly scientific management of any sort in no sense eliminates the personal equation but only gives it a particular direction and, if the administration is successful, a highly developed intensity.

The question of whether time limits are generally fixed in advance or all fixed when the jobs start, hardly affects the necessity of the Ratefixer having advice of every job started. If the Ratefixer perambulates the shop he may be expected to inform himself on this point, but where his time is taken up by planning work in his office, the advice requires to be sent to him.

5-61. The application of job data involves identification of the operation in question. If operations on a component, bearing a part number, are in question, the operations will most conveniently take up sequence numbers (1 and up) under the part number. With operations involving various components, the identification may not be so easily arranged. and the simplest course may be to have an operation register from which arbitrary numbers can be taken as required—the requisite particulars of operation and parts concerned being entered therein. This means a cross indexing scheme under an appropriate classification. To minimise the clerical work the full details may be entered only under the class reference and little more than the class numbers entered against the consecutive series of operation numbers in the operation register.

In the discussion under Works Accounts, the point is made that the detail costing of components belongs to the field of ratefixing rather than ordinary cost accounting.

The reason for this suggestion is that the Ratefixer is altogether more qualified than the Cost Clerk to apply the information necessary for component costing to the betterment of production efficiency. The case may be different when the nature of the work allows orders for each sort of components to be treated as official orders in the cost accounts and fully costed as in the case of complete assembled product. Under such conditions, the division of the total cost of the order by the number of components finished may be sufficient as a component cost, although helping very little as an index to production efficiency—mainly, perhaps, as not in detail suitable for demonstrating a falling off and quite probably too late to be of any use.

The functions of the Ratefixing Department require, therefore, to be extended to the application of job data in the form of Component Cost Comparison Cards, where the net results of each operation on each batch are set out as the job tickets come through completed. By rendering the results in terms of wages cost in pence per piece and also of machine charges per piece, the means are provided for following production results very closely and, incidentally, for furnishing component costs on a sound basis, seeing that average result may be taken for each operation. **Ratefixing** 5-63.

There is an intermediate stage to the preceding one in the control of production costs, and one that is the more important, namely for someone to see that all performances are satisfactorily within the time limit, without looking to comparative wages costs, and to investigate all instances to the contrary. Where the volume of work justifies it the man appointed for this investigation should not be engaged on the ratefixing, so that he brings to bear an independent, or at any rate a fresh view, particularly because the time limit used as a standard for comparison is itself, in part, a matter of judgment. 5-62.

The routine by which the Ratefixing Department are promptly notified of time limits being exceeded may be by the issue of specially coloured Excess Time Slips from the Wages Office, in contradistinction to the Extra Pay Slips carrying payments, which will be issued to the men with their weekly pay card. The Ratefixing Department could be made responsible for discussing with the Foreman as to these excesses, making reference beforehand to previous performances. Investigation on these lines, and not necessarily confined to excesses, when carried out in a fair-minded spirit should go far to eradicate any well-grounded complaints by the men, while it should materially stimulate production by discovering hindrances to efficiency.

When the work approximates to mass production and there are long runs of work, the control of production costs, and, therefore, of output, is to be effected by the daily checking of work turned out from each producing unit concerned. This routine of work-taking, as it is called, is vital under these circumstances, and needs to be arranged so that the purposes of job tickets and viewing certificates for extra pay shall be conveniently met from the records of the Work Taker. It may prove convenient to have the Work Taker stationed at the View Room entrance, if the work is brought in after each operation for viewing purposes, but the matter is one for local decision. The essential point is that each day's output from each producing unit shall be watched, and any falling off from an accepted standard immediately brought to the Foreman's attention. This may be said to be the ideal routine with all production, as it is difficult to obviate some delay occurring in notifying the Foreman

Ratefixing. if any other routine is used. The Foreman, through his chargehands and his own observation should know a good deal as to how jobs are going without any outside aid, and this may have to be his only means of control while the job is actually in progress when work-taking is not feasible. Enquiry and action after the event will establish a desirable atmosphere of discipline, and may be expected to favourably affect matters the next time the job comes through.

Possibly the best alternative to work-taking for jobs of much variety is for the Ratefixer to concern himself with the rate of progress of jobs in hand. The arrangement is hardly likely to be feasible unless changes of jobs are relatively infrequent. To facilitate this method of control each workman may be required to hold his job ticket and to enter up on same the time spent each day.

Throughout the preceding discussion it has been assumed that ratefixing has reference to a system of extra pay and more particularly the premium system, but there might be even more return under a daywork system in following out the broad principles of ratefixing.

Inspection. Inspection is a very necessary factor in production efficiency but it has been found convenient to anticipate the discussion of some aspects of the matter under the headings of "Drawings, Specifications and Patterns." Some discussion of final inspection is provided under the heading of "Despatch."

There remains to be considered here more particularly questions of shop inspection by viewers, as they are frequently called, either working in or attached to a View Room.

It may be taken as only sound practice to have the View Room directly responsible to the Works Manager, and quite independent of the Machine and Fitting Departments.

Viewing means verification, and is suitable as a distinctive term for viewing between processes and operations and on the completion of the component ready for assembling. Viewing after that stage is more of the nature of final inspection.

The extent to which viewing is carried out will vary with conditions. Where the interchangeability of high grade work is in question, there must be viewing either between every operation or between limited groups of operations, designated stages. The decision as to the viewing stages should be embodied in the operation schedule, if planned ahead. If interchangeability is seriously attempted, the viewing necessary for that purpose may be expected to meet the requirements of a piecework or premium system, and, moreover, will hardly be lessened under a daywork system.

The application of limit gauges has been already sufficiently referred to, as also the advantage of indicating on the various drawings the appropriate size limits, either in actual dimensions or by reference **Inspection.** to a table by means of a symbol.

It may be remarked here that it is eminently desirable to have a separate set of gauges for View Room use as a check against the accuracy of the gauges in shop use.

It is usual and necessary for each viewer to have his own particular stamps for marking work he has passed. This may be by initial if only one or two viewers, but otherwise by symbol. Sometimes the marks are varied each year so as to roughly date the work.

In regard to the routine of passing Job Tickets, it may be taken that a viewing certificate in some form or other is essential for purposes of payment of piecework balance or premium. The certificate may be given on the Job Ticket itself or on a separate Stage 5-97. Ticket. The possibilities attaching to the latter scheme are discussed earlier in this section under " Progressing."

A rule is sometimes laid down that no job ticket may be passed except the batch in question be completed as originally intended. This means holding up the job ticket and any extra pay due to the man thereon, until replacements have been put through to meet any rejections at the operation in question. It can hardly be doubted that when any parts are sent back by the Viewer for correction that the rest of the batch ought to wait until the correction has been effected, except in rare cases.

The advantage of holding up job tickets until the batches in question are completed lies in making the shops interested in getting replacements put through as promptly as possible, and therefore, as cheaply as possible. Regulation of the work in progress is vastly facilitated by the certainty of getting the full quota ordered in each batch or sub-order.

In the matter of work done in automatic and semi-automatic machines it will usually be desirable to get specimens of the work viewed before proceeding with the bulk. It will be usually desirable to indicate on the Work Tallies the operations and quantities passed, though this course may only be imperative in the case of split viewing, when the whole batch is not dealt with or only part is sent forward on account of rejections.

Turning to the matter of rejections these can be conveniently, reported by means of a simple Viewing Report. Such reports 5-98. require to be in triplicate so that one copy may go immediately to the Works Office to provide for attention being given to replacement, while a second copy goes to the Work Depot with the rejected material, the third copy being retained by the Viewing Chargehand. Probably the Works Manager will want to see all rejections before 5-87. same are disposed of by the Stores.

Inspection. Instances of doubtful rejection, equally with errors and deficiencies in drawings or lists, or any other matter coming properly under the viewers' notice can be dealt with by a Viewing Report.

The copy sent to the Works Office can very well be passed on to the Ratefixer for appraising the cost of material and labour wasted. The Ratefixer, or maybe the Estimator, can draw up a fortnightly return of all scrapping that occurs, indicating the values against the respective department. This appraisement may be written on the back of the Viewing Report and same sent on to the Works Accounts Office for adjustment of the cost accounts, on the lines discussed in that connection.

It is necessary to make a ruling that no replacement may be put in hand, and no drawing or list corrected except on the basis of a Viewing Report. The necessity in the case of drawings and lists arises from the need of all the proper parties to trace the effect of such corrections once a drawing or list has been issued. In the case of errors detected in the Drawing Office, or of suspensions of work on certain components being found necessary, the routine would be for
5·49. the Drawing Office to send an instruction to the View Room. The View Room would look into the position of the work in question and proceed to make out a suitable Viewing Report.

Supervision. The scope of supervision and inferentially of a foreman's functions were referred to at the beginning of this section.

Consideration has now been given to the various subjects that were there declared as not being necessarily associated with the foreman, and it remains to consider the field that is held to be his unquestioned province.

Supervision is not merely a question of discipline, though discipline is important, but rather it is a matter of managing workmen so as to have their goodwill and their best service. It is hardly likely that good service can be obtained without good will, though it is quite possible to obtain their good will accompanied by inefficient service.

Much knowledge of men is requisite for a good foreman, and he will not achieve much in that direction without a sympathetic outlook, which is quite different to indulging in a sentimental outlook. The personal magnetism or natural influence of a foreman over his men may mean much in avoiding trade disputes, more particularly if he can intuitively detect trouble in its earliest stages and guide the Management as to the remedy.

A Works Manager cannot help but delegate some measure of his responsibility to his foremen and he must always be dependent on their loyalty. For this reason a Works Manager must handle his foremen with all the skill he possesses so as to ensure not merely a loyalty in words but a loyalty in deeds as expressed in shop efficiency.

Supervision.

In attempting any high degree of production efficiency by employing specialists at each element of the work involved, the Works Manager's prime concern is to convince his foremen as to the advantage of such specialisation, and at the same time to ensure each foreman's enthusiasm for his special sphere of work, namely supervision.

The desirability, if not absolute necessity, of first carrying the foremen's favourable verdict in any schemes touching the working of the shops makes it necessary to start gently with new developments. The point to be borne in mind is that the foremen and chargehands represent the Management in dealing with the workmen, and if the former become disaffected the disturbing influence consciously or unconsciously exerted on the men may be disastrous.

One commendable step towards stimulating loyalty on the part of foremen and chargehands is to persuade them to join the Foremen's Mutual Benefit Society in connection with the Engineering Employers' Federation. This gives them benefits of exceptional character through the employer also contributing in respect to each staff member. It is quite important the supervision staff should join this society as an alternative to remaining members of a Trades Union with consequent tied hands in dealing with the men.

Another step in the right direction is to institute a bonus scheme for the foremen and chargehands. There are apt to be difficulties in the way, but one good scheme, if ratefixing is an entirely independent responsibility, is to pay the chargehands the same percentage of bonus as the men earn on the average. This could be a fortnightly distribution, and might take cognisance of the timekeeping of the chargehands. The scheme cannot be applied quite safely to the foremen as they are likely to have a voice in some of the time limits, however occasional. In their case some scheme based on the sales value of output generally may be best as broadening their interests in co-operating with other departments and generally in getting deliveries effected to time.

The importance of regular meetings of the Works Manager in committee with the foremen can hardly be overrated, where the Works Manager is effectively in command.

A reference is necessary to the method of paying foremen and chargehands. When a standing wage is paid there is more likelihood of time being lost in the mornings, though this may be met by a bonus scheme in which punctuality is recognised, while in the matter of overtime there may be undue reluctance to stay behind when the men are working late. If, on the other hand, an hourly rate is paid there may be unnecessary overtime worked, though a foreman or

Supervision.

chargehand guilty of that ought to be found out in one way or another as unfitted for his post. If any risk has to be run it seems better to run the risk of paying a little too much for supervision than not to have enough supervision. The more usual course is to pay the foreman a standing wage and to pay the chargehands at an hourly rate.

An alternative is to pay a standing minimum wage and to pay for overtime after a certain number of hours have been worked during the week. This would meet the case of excessive overtime, but would involve no payment for occasional overtime of a minor character.

In considering the duties of foremen, the first point is that their clerical work shall be reduced to a minimum. This has been steadily kept in view in the various discussions relating to shop routine, and there should be no difficulty in meeting these requirements.

A point may be made as to the responsibilities of foremen for such matters as machine guards—this has been held to be their legal responsibility—notification of accidents and Factory Act requirements generally, including overtime restrictions affecting young persons under 18.

Section IIIf.

Despatch.

Scope of Section.

The subject of despatch as treated here covers a wider field than the actual operations of despatching.

Consideration is given to the holding of stock in readiness for sales and the appropriation of same to Sales Orders, including in this term Sales Repairs and Sundries Order.

Further, there is the question of finished weight records for design and estimating purposes, and also the registration of completed product, as to variations from standard design and the like.

The latter question is intimately associated with that of final inspection, and final inspection in its turn may be a somewhat formidable process, according to the nature of the business and the requirements of the customers, involving possibly tests under service conditions.

The process of final inspection may be said to be completed only by the handing over of the product to the Despatch Department or Warehouse, as it may more conveniently be termed here, or by the actual erection *in situ* and conduct of tests.

The primary function of the Warehouse may be described as the housing of wares ready for sale in contradistinction to the General

Stores, which exists essentially to serve the interests of production, and to the Work Depot which is a sort of regulating station for the work in course of production.

Scope of Section.

When all sales are of the nature of special product, there will be little occasion for the Warehouse as such, but there must be a Despatching Department in any case, and it is very important to separate the General Stores system from the Despatch system.

The Warehouse is the obvious location for the Despatching Department, and it will simplify discussion to cover by the single term of Warehouse all the functions of a despatching department as well as those pertaining to a stock room of saleable product.

Although final inspection is really the completing stage of production, rather than part of the despatch routine, yet it is convenient to consider the matter in the present section as so intimately associated with the despatch routine under some conditions, if not all.

Of course, where the Warehouse is not under the Works Manager, such as will occur where goods are distributed from some centre away from the Works, the final inspection stage is likely to end with delivery to the Warehouse.

In those businesses where final inspection figures at all largely, despatch may often be arranged within the Works proper and the goods may never be handled by the Warehouse staff. The packing, for instance, being carried out possibly by carpenters in their own department. Against this likelihood may be set the consideration that packing is not usually done most economically under those conditions.

The point that needs to be brought out here is the difficulty of legislating on even general lines, seeing how widely varying are the conditions attendant on the despatch of goods in different works.

Warehouse Stock.

The character of warehouse stock is essentially stock ready for sale, except may-be as to some minor modifications to suit different customers—modifications that, for the most part, will seldom entail calling in mechanics from the works, and less often still, necessitate the goods being sent into the works for alterations.

In certain businesses, typically of course that of the motor car, spare parts are likely to be an important line of saleable stock, but whether of large extent or not, the stock of spare parts is really warehouse stock, and certainly should be kept distinct from assembling stock. The fact that the main provision for supplying spare parts may be made by holding reserve stock of rough components only—to be finished as required—does not detract from the principle of holding all finished spare parts in the Warehouse, while holding the reserve stock of rough parts in the General Stores.

Warehouse Stock.

The major portion of warehouse stock may be assumed to be complete products. These complete products may be further assumed as all coming from the Works, although, when other makers goods are factored, no essential difference arises beyond that the purchased goods in question may be received direct into the Warehouse from the supplier, instead of through the General Stores or View Room or other Works departments.

Here again the nature of the goods and the nature of the inspection required before acceptance would regulate the routine as to receipt.

The maintenance of warehouse stock needs to be based on estimated sales requirements, and these estimates again will be largely influenced by previous sales statistics.

Warehouse stock control records should, therefore, embody statistics of sales to date, a consideration for which there is no parallel in the case of general stock.

Another aspect peculiar to warehouse stock is that of sales appropriation. The appropriation of stock in hand should be, in one way, little less than despatching, unless despatch waits on other matters, when labelling conspicuously may be sufficient appropriation pending despatch. Appropriation of this sort does not secure any stock control, nor does it meet in any way the case of stock appropriated before delivery to the Warehouse.

The principle may be laid down with safety that all production of warehouse stock must be sanctioned by the General Manager. He may, with advantage, make his decisions in committee with the heads of departments interested, supported by the data of previous sales and so on.

These sanctions will be embodied in Stock Manufacturing Orders, and it is this order reference under which the Works must make deliveries of the finished articles to the Warehouse.

This reference should be, if possible, stamped or painted on every such article, and, in addition, each one should be plainly labelled with the same and the date received at the Warehouse.

As a matter of fact this identification of warehouse stock requires to be carried a stage further, at least as regards complete product, namely, to the extent of giving a progressive number to each article.

Very commonly progressive numbers are given as consecutive numbers in one continuous series irrespective of manufacturing orders. These result, as for instance, in the case of typewriters, in large numbers being reached with the advantage of the numbers being relatively indicative of date of production. This advantage is not always a desirable one perhaps, when dates of production bear on selling prices, and there is not uncommonly a misleading element in these numbers if, as is usually done, blocks of progressive numbers are allotted to each manufacturing order when issued. The sequence of actual production may then have no sort of relation to the sequence of progressive numbers, and may be many months out when production under an order is delayed or suspended. **Warehouse Stock.**

A little difficulty may arise as to progressive numbers when many lines of product are made, each involving a distinct sequence in continuous numbering. Another point, too, is the use of marking machines for applying straight numbers, such as result from the continuous method of numbering.

When these considerations do not weigh, the better plan may be to number the complete product consecutively for each manufacturing order only. This gives a double-barrelled number as 1387-1, 1387-2, etc., but identifies the product in the essentials necessary for internal reference and conveys little impression one way or the other to the public.

When faults of design eventuate after the product has been despatched, the manufacturing order number conveyed by the progressive number will be illuminating. A single cross-reference in the case of continuous numbering will, for that matter, put that method on the same footing, although there is no denying the advantage, mainly from the administrative point of view, that lies in avoiding the necessity of cross-references.

Whenever progressive numbers are adopted they ought, generally speaking, to be quoted on the respective advices of despatch and sales invoices.

A reasonable corollary of any numbering scheme is that there shall be a Progressive Number Register, wherein the numbers 5-107. taken up shall be indicated with suitable details as to design and a completing entry for each item of the sales order under which it has been despatched, under some circumstances giving the customer's name to facilitate finding the necessary identification of any product under correspondence should the customer not quote same. By including the progressive number on the invoice this use of the register may be less frequent.

Registers of this sort will for some businesses be invaluable, while for others they will not be worth the labour. There may easily be a distinct advantage in adopting the identification scheme without a complete register being attempted.

Where stock manufacturing order references are utilised for progressive numbering, it will be necessary to avoid grouping various sizes or kinds of product under one reference. This point holds good for other reasons, particularly as to stock control.

In the appropriation of stock that is not immediately available for despatch in that it is not yet delivered to the warehouse, it will

Warehouse Stock.

usually be safer not to appropriate any particular progressive numbers. Anticipations of this sort have a way of not working out, unless some special feature leaves no other course open from the beginning.

Progressive numbers really only come into force when erection is commenced, and the appropriation of a particular number to any specific sales order is best deferred until the erection reaches the stage at which special sales requirements must take effect. Alternatively, in the case of products where erection or building up constitutes an early stage, such as a chassis frame or boiler shell, then the progressive number requires to be applied at that stage and maintained right through as a reference. The only point, then, is that the appropriation of the respective progressive numbers to particular sales orders shall be left to the final erecting stage if possible.

This is aside from strictly warehouse stock, which may be taken as only amenable to such sales requirements as can be met after the product reaches the warehouse.

Turning more directly to stock control, it may be taken that the warehouseman will apply to the proper quarters for further stock sanctions, involving the issue of stock manufacturing orders, as the products in hand or on order fall below the accepted ordering level by reason of despatch or sales appropriation.

This routine may be regularised by using a separate duplicate
5·106. memorandum book with the sheets endorsed by rubber stamps,

"Application for Warehouse Stock Sanction,"

5·57. with spaces for stating unappropriated stock in hand and in progress, and sales statistics for the preceding twelve months and also current year to date, expressed as monthly averages.

Deliveries to the warehouse of stock product require to be accom-
5·99. panied by an Inspection Certificate. This inspection authority may conceivably be vested in the Assistant Works Manager, if his qualification and opportunities allow. There will usually be some scope for judgment as to finish and possibly as to satisfactory efficiency under test.

The warehouse stock records may be arranged in album form with removable leaves and adhesive slips, overlapping each other to save space, for each manufacturing order. Deliveries to the warehouse will be duly entered from the Inspection Certificates, and sales appropriation will be indicated by pencil entries to be inked in as the items are despatched. The unappropriated stock, whether in the warehouse or in the shops uncompleted, will be brought forward at each appropriation. It rather simplifies matters if the stock received from the works is entered down in as many lines as there are items, that is one unit per line. The appropriation can be entered in the same way. Further, in the column provided for quantity on order from the works, these can be entered in consecutive numbers—one per line—thus showing almost graphically the quantity received, the quantity to come, and the quantity appropriated.

Warehouse Stock.

Progressive numbers should not be entered on these slips except as the items are despatched.

The information as to the sales to date, *i.e.* from the commencement of the year, can be always kept at hand by making the requisite totals on the sheets on which the slips are mounted.

The same results can be obtained by the use of a suitably ruled Warehouse Stock Record Sheet as illustrated (Form 5-110). Despatches from warehouse stock will be reported to the Works Accounts Office daily. 5-111.

Final Inspection.

The essential routine as to deliveries of product to the warehouse, whether made under a Stock Manufacturing Order or under a Sales Order, has been summed up in stating that an Inspection Certificate should be furnished as to every delivery. In this connection the value of progressive numbers is most marked.

The individual erection specification cards, in the form of Erecting Sub-Orders, may, as an alternative to a separate Inspection Certificate, be signed as to inspection. 5-102.

Where progressive numbers are not particularly necessary at the erection stage, or where, as in the case of small products, there is hardly any erection stage to be considered, the progressive numbers can probably be put on by the Inspector, constituting his hall-mark.

Under many conditions, especially where special product is concerned, the Drawing Office can best carry out the final inspection, checking against the specifications pertaining to the Sales Order.

Apart from this final inspection there may be occasion for a Test Certificate to be issued, as in the case of motors guaranteed to give not less than a specified horse-power or valves to stand a certain pressure, before the product can be accepted into stock.

Despatch of product from warehouse stock must be subject to a final inspection, to insure that the product is complete in every way at the time of despatch, and that all accessories and spare parts have been correctly selected.

Final inspection may need to include the certification that all necessary Patent Numbers, Registered Design Numbers, or Trade Marks or the like have been marked on the product.

In drawing up the instructions to the inspector, regard needs to

Final Inspection.

be paid to the legal aspect, as to which the following extracts indicate some of the points.

Extract from the Patents and Designs Act, 1907.

A patentee shall not be entitled to recover any damages in respect of any infringement of a patent granted after the commencement of this Act from any defendant who proves that at the date of the infringement he was not aware, nor had reasonable means of making himself aware, of the existence of the patent, and the marking of an article with the word "patent," "patented," or any word or words expressing or implying that a patent has been obtained for the article, stamped, engraved, impressed on, or otherwise applied to the article, shall not be deemed to constitute notice of the existence of the patent unless the word or words are accompanied by the year and number of the patent:

Provided that nothing in this section shall affect any proceedings for an injunction.

If any person falsely represents that any article sold by him is a patented article, or falsely describes any design applied to any article sold by him as registered, he shall be liable for every offence, on conviction under the Summary Jurisdiction Acts, to a fine not exceeding five pounds.

If any person sells an article having stamped, engraved, or impressed thereon or otherwise applied thereto the word "patent," "patented," "registered," or any other word expressing or implying that the article is patented or that the design applied thereto is registered, he shall be deemed for the purposes of this section to represent that the article is a patented article or that the design applied thereto is a registered design.

Extract from Designs Rules, 1908.

MARKING OF ARTICLES.

Before delivery on sale of any article to which a registered design has been applied, the proprietor of such design shall cause each such article to be marked with the word REGISTERED, or with the abbreviation REGD., or with the abbreviation RD., as he may choose, and also (except in the case of articles to which have been applied designs registered in Classes 9, 13, 14 and 15*) with the number appearing on the certificate of registration.

* Textile Goods.

In some businesses final inspection is carried through largely by the customer's own inspectors, and the works inspection is relieved to some extent. Against that must be set the importance of knowing that everything is right before the day on which the customer's inspector is to call. If the work is not right, he should be advised in time to save an unnecessary journey.

A point may be made here as to the wisdom of providing every facility possible for inspection, so that a visiting inspector's time and temper shall be saved. This consideration must always tend to better feeling between parties, and all goes to establish a good reputation.

There is no more than reasonable business courtesy in attending also to the personal convenience of customer's representatives while at the works, as, for instance, providing luncheons when such a course does not seem an attempt to put the visiting Inspector under an obligation.

Sales Order Routine.

Where warehouse stock is held, the Sales Orders will be susceptible to being filled from stock without the intervention of Drawing Office or Works.

There will be other cases where the order may be filled by slight modification of stock product.

Oftentimes sales will be effected of standard product that may in some cases be kept regularly in stock, and in other cases be made only to meet specific sales orders. In the latter case the production

Sales Order Routine.

may very well be carried out under the Sales Order Number, rather than make the isolated items for stock under a Stock Manufacturing Order.

As to the case of a customer's order covering a range of products, some in the category of warehouse stock and some of a special character, it may be better to issue separate Sales Orders for the different lines, insuring the necessary cross-reference by giving the despatch instructions on one order only and connecting the other thereto.

In issuing the Sales Orders delays may be avoided if no discrimination is attempted in the first instance, as to whether the goods will come from stock or be specially made.

If discrimination is to be made, the Estimator will be perhaps the best qualified to exercise it, and it simplifies the routine greatly if he issues the Sales Orders.

Whether it is expedient to have more than one series of Sales Orders or not, those that have to be treated as Production Orders, in that the product required has to be specially made, need to be issued accordingly to the Works Manager, Drawing Office, Production Office, and Inspector at least. As this is likely to entail retyping, a separate production order series may be adopted with its own sequence of numbers, if that is preferred to using a broken range of sales order numbers.

The fewer necessities for cross-reference the better, and the argument is rather in favour of one series only of sales orders, and for sales order references to be applied to production orders as required.

It is obviously important that there shall be no confusion as to how orders are to be filled. A suitable routine will be to issue a complete set of all Sales Orders to the Warehouse—and also to the General Office for invoice reference—and to also supply the Warehouse with a copy of all Production Orders issued to the Works, whether under the Sales Order reference or other reference. They could enter on their copy of the Sales Orders the date of the Production Order, thus making plain the items supposed to come from Warehouse stock. These Production Orders could then be passed over to the Works Accounts Office for their reference.

It might be more convenient for the Works Office to issue Production Orders rather than the Estimator, but the problem of specifying delivery due dates favours the responsibility being put on the Estimator as to filling in these particulars on the Production Orders. The responsibility of the Works Office is to arrange matters so that the Works shall live up to these delivery requirements.

Sales Order Routine.

So far as Sales Repairs and Sundries Orders are concerned, the routine matters discussed for Sales Orders apply quite fully except, perhaps, as to stock control. For spare parts and the like, the method of stock control as discussed under materials may apply more conveniently than having separate Warehouse Stock Control Slips for each Stock Manufacturing Order for spare parts.

The remarks as to progressive numbers can hardly apply to spare parts.

It may be especially important to have Test Certificates before releasing repair jobs.

In the case of Cash Sales, which figure in some businesses, the Cash Sale Receipt can be designed for filling in all the details as would be given on a Sales Order. An extra carbon copy of this receipt can then serve in lieu of a Sales Order.

Incidentally, if the goods are sent off the day the cash is received, there will be no occasion for an advice of despatch, the Cash Sale Receipt serving this function if endorsed—" Despatched per......"

Where counter sales are made, the warehouse, or department effecting the sales, comes under the Shops Act.

Extracts from the Shops Act, 1912.

On at least one week day in each week a shop assistant shall not be employed about the business of a shop after half-past one o'clock in the afternoon.

Every shop shall, save as otherwise provided by this Act, be closed for the serving of customers not later than one o'clock in the afternoon on one week day in every week.

Warehouse Orders.

The Warehouse will frequently have occasion to request work to be done by other departments, and even where the making of packing cases, for instance, is done within the Warehouse, formal instructions should be issued each time.

These requests and instructions may be issued by the warehouseman on his own authority—acting always under an official Sales Order—and may be designated Warehouse Sub-Orders.

They can be made to cover minor modifications of warehouse stock necessary for filling Sales Orders and for making packing cases as already mentioned.

Efficiency in this direction can hardly be effected without individual orders, against which material and time can be booked.

A further development of Warehouse Sub-Orders will be to make them cover demands by the Warehouse from the General Stores as to stock material, most frequently standard fittings, called for under a Sales Sundries Order. The Warehouse Sub-Order as lodged at the General Stores can also serve all the purposes of a Goods Issue Voucher.

Similarly, in the case of spare parts required to be specially made by the Works, the Warehouse Sub-Order can be issued to the Works

Office, who, after arranging as to material (probably from reserve stock), may pass the order on to the Work Depot, accompanied by a Goods Issue Voucher for the rough material.

Warehouse Orders.

The Works Office may override a Warehouse Order by marking it as to its being met from a Stock Manufacturing Order in hand at the time, or they may issue such an order sufficient to more than meet the moment's requirements.

It will be desirable for the Warehouse Sub-Orders to have a coupon attached, that is a perforated portion, that will be filled in as to expected delivery—quoting Stock Manufacturing Order concerned when necessary—and returned by the Works Office to the Warehouse. The Warehouse will mark these expected deliveries on the Sales Order concerned, and file the coupon in sequence of delivery dates so as to follow same up methodically by enquiry at the Work Depot. Customers' protestations may conceivably necessitate varying the sequence in which orders should be met and this must be arranged for.

The cost accounting routine will necessitate a carbon copy of each Warehouse Sub-Order being sent by the Warehouse to the Works Accounts Office.

Packages.

Apart from the routine of getting packing cases or other packages made, there will be questions as to the charge to be made to the customer. This may be said to be a matter of financial accounting, but it may be taken as desirable practice for the Warehouse to fix the price of packing cases. It may be well enough to work to a scale per square foot of area, varied according to the style of case and thickness of timber, or alternatively the costs may be taken out. This detail costing will be made possible by the Warehouse, and with a minimum delay, if entries of all material and labour spent are made on the back of the respective Warehouse Sub-Orders.

The value of each package sent with goods should be filled in on the Advice of Despatch by the warehouse. This leaves the General Office to charge or not as they may deem advisable.

Some customers will decline to pay for packages, and this involves arranging for the return of packages to be followed up, as it becomes very difficult to recover the value of a package that has been away a long time. Not only that, but the later traffic in cases confuses the records, and any serious attempt to clear up old package items is likely to be tedious and to be resented by the customers.

The remedy lies in keeping track of all packages and not letting them lie unheeded at the customer's works.

The first difficulty, and, perhaps, the only difficulty, is that of identification, and to this end every package should be numbered.

Packages. 5-114. Package Tracing Cards in sequence of numbers will be a sufficient register.

The package number should be taken up before issuing the Warehouse Sub-Order for making it, and this number should be branded, if a timber package, or painted on the package as part of the process of making.

The package numbers will appear on the Advice of Despatch and on the Acknowledgment of Goods Received or Credit Note when the package is returned. The system of acknowledging goods received, as mentioned elsewhere, is intended to deal with receipts other than purchased goods, and will mainly deal with receipts from customers. By means of a suitable endorsement such as

"this form constitutes a credit note of the value indicated"

the acknowledgment can, in the case of packages, obviate the necessity of a further credit note. For the Warehouse to fill in the value should mean no more than a reference to the Packing Tracing Card under the respective package number.

Enquiries as to the return of outstanding packages should be made through the General Office, who will discriminate as to the necessity or use of applying for their return. The list supplied by the Warehouse for this purpose, say, at the end of every fortnight, as to packages despatched in the preceding fortnight, will be marked accordingly and sent back to the Warehouse and the remarks noted on the Package Tracing Card. The cards referring to packages which are not likely to be returned by the customer, can be transferred to a "dead" cabinet.

Final Records. The necessity of final records as to finished weights or final fitting up of any goods prior to despatch, will depend on the nature of the business in part, and, as to the final fitting up, mainly on whether the erection is done to drawings or to written instructions or specifications. Usually a specification should be sufficient record, more especially if the Inspection Certificate quotes the specification adhered to.

The advantage, or rather necessity, of taking final records of products hinges on how far product is erected according to unwritten shop practice—certain brief descriptions being sufficient instructions to the shops, but not constituting adequate record after a lapse of time, or at any time, in the hands of new comers.

The point is only made here as a reminder that it may be more expedient to pick up the loose ends of the product history by developing the Warehouse work accordingly, rather than wait for the Drawing Office to become masters of the situation as to precisely how different customers' or different countries' established requirements are met.

Recording finished weights is a fairly simple proposition, but recording final fitting up may call for the services of a technical man. **Final Records.** 5-109.

The greatest value of this arrangement, although, perhaps, not within Warehouse jurisdiction, may lie in recording the alterations in fitting up or general arrangement consequent on repairs being carried out.

The Drawing Office will be the most concerned with all this work, and might supply the man to do it. This representative may be the one to carry the responsibility of checking goods against sales orders and specifications before allowing their despatch.

It is likely to be of much value if a daily notification of orders completed is sent to the Works Office and Works Accounts Office with a view to closing up all records promptly.

There remains now, for discussion, the routine of despatching goods. **Despatch Routine.**

The first point is as to making out a contents list for each package of the items included. This is a very desirable course and has an important function in making for correctness in consignment and the substantiation of claims, whether from the customer as to short delivery or against the carriers as to missing goods.

When a Packing Slip or Contents List is made out it should be, of course, sent with the package either under the label or tacked on, or in an envelope label. 5-112.

Some firms send with their goods plainly worded notices after the following style :

W. BLANK & CO., EFFICIENCY WKS., MAIN ROAD, LONDON.

These goods were *checked by Inspector*, and therefore known to contain all that the Packing Slip calls for.

UNPACK WITH CARE.

Most apparent shortages arise from Goods being left in Packages or thrown out with the Packing. Your own experience will confirm this.

Package No.................... Date.................... Inspector............

The extra clerical work suggested by the use of Packing Slip is very largely offset by allowing a very brief description in the Advice of Despatch. 5-113.

When machinery details are not in question there will probably be less advantage in using Packing Slips, as all the information can be given on the Advice of Despatch.

In the matter of the Advice of Despatch, its most important function is in relation to the General Office for invoicing purposes, though this requirement can be met, if inconveniently so, by a Despatch Book passed between the Warehouse and Financial Department on alternate days (that is, one book for Mon-

Despatch Routine.

days, Wednesdays and Fridays, and another for Tuesdays, Thursdays and Saturdays). This arrangement, cripples the work in both departments, and does not allow the despatches to be invoiced so quickly. The quickest way is to make the invoice out in blank as a carbon copy of the advice.

The customer is entitled to an Advice of Despatch, and this copy should go by post, in case the goods are delayed in transit, and to inform the customer at his office, as distinct from the goods arriving at his works. Sometimes the invoice is the only advice.

It is desirable to have each advice state whether final consignment or only part, and if part, whether first part or later. A separate advice should be used for each Sales Order concerned.

The commission charged by shipping agents for arranging shipments, and making out bills of lading, are based on the number of shipping tons, plus all dock dues and such charges. The usual course is to employ shipping agents to arrange all details of shipments.

Under the Bills of Lading, shipping companies disclaim liability as to non-delivery or damage arising under almost every possible head, as will be appreciated by examining any ordinary Bill of Lading.

As bearing on the question of marine insurance, as insurance of shipping freights is termed, one or two definitions are necessary of the risks that are insured against. These risks, when they materialise, are termed averages, in maritime law.

General Average is the sum falling to be paid by the owners of ship and cargo, in proportion to their several interests, to make good any loss or expense intentionally incurred for the general safety of the ships and cargo, *e.g.* throwing goods overboard, port dues in cases of distress, damage caused in putting out fire on board, etc.

Particular Average has reference to loss or damage to the particular property of any owner of goods, apart from general average, and has, therefore, to be borne by the said owner.

Policies of marine insurance are invariably effected with underwriters at Lloyds, through insurance brokers or shipping agents.

In putting the value on goods for insurance purposes, it is important to include freight, insurance and other charges, as well as a percentage to cover interest on outlay in the event of a total loss, otherwise, in the event of loss, the invoice cost alone could be recovered from Underwriters.

In regard to weight or measurement the rule for oversea freight charges is as follows :

"When a package measures more than it weighs, freight shall

> be charged by measurement, and when a package weighs more than it measures freight shall be charged by weight."

Despatch Routine.

A ton by measurement is taken as forty cubic feet, while a ton by weight is twenty hundredweight.

Incidentally a useful legend for posting in the export packing room is as follows: "*Every inch you save in packing space saves three to four shillings in freight.*" This will be true in enough cases to justify the notice and must stimulate attention.

Goods by Rail.

In the case of goods sent by rail, a Consignment Note will have to be made out and it will be desirable for the sender to use a printed form of his own, clear of all qualifying clauses on the part of the railway company.

There does not appear to be any authority under which railway companies can compel traders to adopt the Railway Company's Consignment Notes, except in the case of explosives and other dangerous traffic. A Consignment Note, when signed, makes a binding contract between the Carrier and the Trader.

The description of goods given on the consignment note should be stated in the terms that will secure the most favourable rating for the goods in question.

To this end it is necessary to consult the "Classification of Merchandise" issued periodically by the Railway Clearing House.

In the matter of rates, these vary according to the amount of risk carried by the sender.

Where a rate at owner's risk is provided, the prescribed form of Risk Note must be signed by the consignor to entitle him to that rate, otherwise the ordinary rate is charged.

Signing a risk rate does not free the Railway Companies from responsibility where the loss or damage is due to any negligence on the part of their servants.

The railway companies are bound to keep rate books at their stations which shall be open to inspection, and this fact has been taken advantage of by certain publishing firms to extract all these rates and publish them in book form.

The great value of these books lies in the information as to all special rates in force from or to any particular stations. No individual trader could very well collect this information even for his known needs without much trouble, and there is always the liability of new needs arising.

The Railway Clearing House classification is usually included in the rate books together with important notes on the various practices of railway companies in relation to goods traffic by merchandise and passenger trains.

Goods by Rail.

One such publication gives the following useful notes in its 1913 edition :

Notes for persons checking Railway accounts and charges.

1st. See that the entries shown on account are correct, and that the charges are payable by you, also that the amounts are correctly cast.

2nd. Refer to the exceptional rates and ascertain if the particular goods are provided for by special rates ; if not consult the classification for the required traffic and apply the Class Rate applicable.

3rd. If your traffic is constant, and in large quantities between your station and some other point, you are entitled to ask the Railways interested to provide an exceptional rate for the traffic, if not already in force.

4th. In view of the amalgamations now taking place, it is well to remember that one of the purposes of Section II. Act 1873, is to prevent rates being raised as a consequence of amalgamation. Rates cannot be raised unless necessary to secure a fair return on the traffic. Also that the Railway Commissioners have power to order that no higher charge shall be made in respect of merchandise carried over a less distance than is charged for like merchandise over a longer distance, on the same line of railway.

5th. Where rates to small villages are not shown, the rates to the nearest town will be sufficient guide.

6th. If in doubt, consult the publishers.

The all round advance in railway rates must bring home to every trader the importance of checking his railway accounts very closely.

Efforts are being made to establish a proper arbitration board for traders on the vexed question of railway charges.

Overcharges are liable to occur as to rates charged, as to weight charged for and as to " paid on " charges. " Paid on " charges arise through the absence of a through rate, when goods travel over more than one company's lines, and represent the charges payable or estimated to be payable, between the companies when the goods are transferred. Application should be made in such cases for a through rate to be arranged, and any excess charges should be claimed for.

It is quite important to have a ledger account with the various railway companies, so as to allow time for properly checking the charges.

In the matter of claims it must be borne in mind that the party who pays the carriage is employing the railway company as carriers, and he it is who must make a claim in the event of damage or non-delivery.

These claims should be definitely embodied as a statement of account against the railway company and payment looked after accordingly, rather than left in the form of correspondence only.

It is of first importance for substantiating claims for damages and shortages that a clear signature shall not have been given, and this should be imposed on the consignee—either on the Advice of Despatch or on the address label, or may be on both, requesting him to sign as " Unexamined."

Valuable assistance in negotiating with railway companies as to rates may be obtained through the medium of such bodies as the Machinery Users Association and Mansion House Association on Railway and Canal Traffic. Some Chambers of Commerce also provide this class of service to members.

Delivery by Works Vehicle.

It will be well to investigate very fully the saving to be effected by making deliveries by a works vehicle, either to customers or to railway stations. In the latter case a rebate could be claimed each month, except when goods are consigned " Station to Station " (S. to S.) rate. Delivery requirements at the consignee's end may mean despatching under " Collection and Delivery " (C. and D.) rates, and it is the collection that may be undertaken by the works vehicle instead of the railway company doing it. Rebate needs to be claimed accordingly each month. Signatures in this event are obtained at the station on the Warehouse copy of the Consignment Note previously mentioned.

In case of goods received from suppliers, rebates may be earned by carting from the station to the home works.

The cartage rates for London within a specified boundary, as adopted by the railway companies, vary from 3s. 4d. to 6s. 8d. per ton for general traffic, consigned under " S to S " rates.

Drawbacks or rebates allowed for cartage in the case of " C and D " traffic when same is not performed by the railway company range from 1s. 9d. to 6s. 8d. per ton.

When goods are delivered by a works vehicle, the routine as to Advice of Despatch requires to be such that the signature as to receipt be obtained by the carter on delivery. As this will be away from the Warehouse, the signature cannot be given very well on the fast copies in the Advice of Despatch Book as retained by the Warehouse. A common alternative is to have a carter's book in which the necessary detail of each delivery are written out again.

SECTION IV

WORKS ACCOUNTS

Accounts titles in italics refer to financial accounts.

Functions of Works Accounts.

Section IV a

Definition of Works Accounts.

THE point of view taken with regard to the Works Accounts is that they shall deal with every item of expenditure, entering into the cost of producing and delivering all goods sold or intended to be sold.

This definition might be amplified by reference to the fact that plant expenditure and its influence on the cost of production comes within the scope of Works Accounts.

The cost of production is the essential object to be attained by any system of Works Accounts, but it is doubtful if the use of the term " Cost Accounts " or " Cost Keeping " conveys the whole meaning. Such an expression, while it may be given a very wide or very narrow meaning, certainly implies to the commercial man—and a Company Director is usually a commercial man—that the object of keeping Cost Accounts is purely to find out the prime costs of production. Unfortunately, these prime costs, to his mind, often mean merely the direct material and direct wages costs, and the question of indirect costs only interests him as requiring some mental provision when fixing a selling price. He recognises well enough that the indirect costs or works expenses must be met, but if the " blend " of business comes out right, he does not mind on what work or classes of work these expenses are recovered. When the blend does not come out right, then, of course, the Works Manager has to explain.

This reliance on the " blend " is well enough from a merchant's point of view, for the merchant has only commercial expenses to provide for, and if he averages these on his turnover he is not unqualified to know fairly well what business pays him well and what does not. Of course different lines of business may involve differing expenses to obtain, but a shrewd man can tell his margin of profit near enough for all practical purposes, because he knows what the goods will cost him, and has only to discriminate in regard to his

Definition of Works Accounts.

commercial expenses. In the engineering trades these might, perhaps, be averaged at ten per cent. on the turnover.

If our manufacturing director knows what the goods cost him, as the merchant knows, then his business acumen can be trusted to tell him what work will pay him and what will not.

This separation of commercial expenses from works expenses will be found to have a far-reaching effect in the control of both.

There are works to-day in this country which are overburdened with commercial expenses, and separating out the expenses should result in a broader view of what constitutes manufacturing efficiency. It is symptomatic of the view-point of many directors that the salaries of responsible works officials average much less than those of responsible commercial officials.

It is not hereby suggested that all these things have happened because Cost Accounts are not—or are not called—Works Accounts, but the discussion will serve to bring out the essential importance of Works Accounts being really comprehensive of all the costs of production. It is a matter of convenience usually to include in the Works Accounts the cost of delivery of goods, as no principle is violated, seeing that such costs are almost entirely individual to the respective sales, and can be allocated with precision.

Another aspect of Works Accounts, and possibly one that is as valuable as their use for obtaining the costs of production for commercial purposes, is their use for administrative purposes. This use also suggests the use of the broader term, if only that the term Cost Accounts does not bring out the responsibilities attaching to the works relative to Works Additions, Developments and Experiments, Cost of remedying faulty work under guarantee, Usefulness of Stock, Valuation of Plant, and indeed every matter pertaining to the Works that figures in any sort of account.

Costing a matter of Approximation.

The art of costing is essentially one of close approximations rather than the collection of absolute facts. Perhaps material purchase costs will seem absolute enough, but when the material is issued in detail to the shops, there will be a proportion of material wasted, and quite often unavoidable errors in allocation as to quantity or price. With proper organisation there will be small scope for waste, but there will even then be some margin of material issued that does not go into the article produced. Further, taking the swarf, or turnings and drillings—in the case of iron and steel their value is so small that to ignore that value does not make much difference to the true material cost, but when gun-metal or other expensive alloys are in question, then the value of the swarf may be substantial. With some classes of work, such as ships' repairs, the value allowed in the estimate for the swarf recovered may make all the difference in obtaining orders.

Costing a matter of Approximation.

However precisely the net quantities of materials are obtained there will be a call for judgment in the prices to be charged in the costs. There will be the actual purchase cost when the origin of the material is known, there will be the average purchase cost of material from stock, and the current market price of the material in question to choose from. None of these prices stands unquestionably as the true cost in the academic sense of the word true, but anyone may be held to be the correct cost, or a sufficiently close approximation for all practical purposes.

Turning to wages costs, until men become absolutely automatic machines and administration is perfected in the last degree, there can be no guarantee of the absolute accuracy of the time charged to a given job.

Some administrations place unwarranted faith in the infallibility of a time recorder stamping, because the men are supposed to clock "OFF" at the moment of finishing one job, and to clock "ON" at the moment of commencing another job. What happens in practice is that the man clocks "OFF" the finished job just when and not until he is ready to clock "ON" his new job. This is sometimes taken as implying accuracy in time recording, whereas such accuracy as it does possess is an accuracy in time allocation considered merely from an accounting point of view. Those systems that provide for the time lost between jobs being charged up to a special account neglect the human nature of most foremen.

A costing system by itself cannot prevent all waste of time, and waste prevention is the special function of administration. Any waste time that is included in the direct wages costs obviously detracts from the accuracy of the cost records, and leaves them as an approximation to the truth, just as near or as far as that particular aspect of the administration is efficient or inefficient.

The wasted time and errors in booking time that may be cloaked by a mechanical time recording system are usually far less than when Time Recorders are not used, though efficiency in this respect is not inseparably bound up with clocking methods.

As to strict accuracy in the allocation of Works Expenses this is obviously impossible, but it is in this field that so much return is yielded by a scientific investigation of the approximately true incidence of expense.

Responsibility for Works Accounts.

If the Works Accounts are to reflect faithfully the full stewardship of the Works Manager, the point will arise as to his responsibility for their correct preparation. There is little doubt that it is quite

Responsibility for Works Accounts.

desirable that the Works Manager should be responsible for the works accounts. At the same time, qualifications of this character are not usually acquired by works managers. In ordinary circumstances the official in charge of the Works Accounts Office, who may be termed the Works Accountant, should be directly responsible to the Financial Manager (to use the term adopted in Section II a—Staff Organisation).

The Works Accountant should be a type of man able to co-operate with the Works Manager, and all important matters of works organisation necessary for achieving their mutual purpose should be agreed with the General Manager.

Co-operation means in this instance the mutual recognition that both are seeking for the truth all the time, however unpleasant the facts may prove to be. The Works Manager may not look upon the Works Accounts as figures apart from himself, nor ought the Works Accountant, by a narrow-minded view, to deceive himself and limit his own usefulness, by holding the theory that the Works Accounting system, in collecting the figures, will at the same time, make plain all the truth. He needs all the help the Works Manager can give him and perhaps much more, if he is to present by his accounts a really intelligent perspective of the Works' activities and efficiency.

When the Cost Department as ordinarily constituted is, as it frequently is, an integral part of the Financial Department, the co-operation between the Chief Cost Clerk (as he is probably called) and the Works Manager is unlikely to be very effective.

Without dilating much further on this subject, it may be mentioned that the successful co-operation of Works Manager and Works Accountant depends on the training of each. The Works Manager ought to have had at least sufficient experience in estimating and rate-fixing, to understand the difficulties of Works Accounts, and the Works Accountant ought to have had some shop and drawing office training before specialising in accountancy. The Works Accountant's functions can then be extended to assist the Works Manager in the routine organisation and the clerical work of the factory. This deeper knowledge and wider sphere of usefulness would make him the more valuable as a member of Works Committees.

Works Accounts and Works Efficiency.

The line taken in this book with regard to Works Accounts makes it misleading to consider the staff as existing for costing purposes only, and therefore it is suggested that the expense of same should be included under Works Management and Administration. It serves no good purpose to allow the impression to be formed that the expense of keeping the Works Accounts is one that can properly

Works Accounts and Works Efficiency.

be criticised apart from the other administrative and clerical expenses of the Works. It is very desirable too that expenses of this character should be compared with the gross works profit, because that is the criterion of the Works success, and if an increase in administrative expenses can be shewn to bring about an increase in works profit, it is possible that the ordinary commercially trained Director may then see that expenditure to obtain efficient administration pays. He is, however, more likely to consider that the credit for increased profits is due to the handling of the commercial side of the business or to trade conditions, and he is likely to be partly right, for slackness of trade, impossible contracts, or a vacillating selling policy will quickly drown all account evidence of works efficiency. This means that the Works Manager's self-interest in the commercial efficiency of a business is very real if he has any ambition for the works efficiency to become evident.

The Works Manager must bear in mind that in striving to achieve works efficiency, he must at the same time have the tact and patience necessary to bring the desirability of his aims home to the Directors so as to ensure their good-will. A proper system of Works Accounts will help his cause under all conditions, though some conditions are very discouraging.

Works Accounts, however admirable, are not synonymous with works efficiency, but they can be and ought to be landmarks to guide the traveller who knows their true meaning.

Financial Account Requirements.

It is a primary necessity of a satisfactory system of Works Accounts that there shall be entire agreement with the financial accounts.

From the point of view of the financial accounts the matter is one of expenditure by and on behalf of the Works, of which the Works Accounts Office must render a full return dissected to meet the requirements of the financial accounts.

These requirements are regulated mainly by the accepted standards adopted by auditors and approved by the commercial community.

There is none the less room for considerable divergence of treatment even within these limits, and therefore it is imperative to give consideration to the particular system of financial accounts in use before the Works Accounts are tackled in any scheme of reörganisation. It is this aspect of the case that explains why costing systems are more commonly organised from the accountancy point of view than from the administrative one.

The importance of an independent discussion of financial accounts that would narrow down the lines of communication between the works accounts and the financial accounts, to their mutual "understandability" and elasticity, has made the author seek a collaborator

Financial Account Requirements.

who was able to deal with the Financial Accounts section of this work from the point of view of actual commercial experience.

It is perhaps hardly necessary to point out that the treatment of Financial Accounts in Section VI. is in strict conformity with the best canons of English Accountancy, and the system of Works Accounts to be described has been devised so as to be adequately controlled by the Financial Accounts—a consideration which is apt to be overlooked by Works Managers whose interests are centred in production efficiency, and therefore aim to have their costing methods serve that end, rather than to facilitate accountancy efficiency. It is intended to show how the requirements of both parties can be met, which may help to strengthen the hand of those managers who find some established system of accounts to be a stumbling block in the path of progress.

Works Account Periods.

The determination of the periods that shall be used in the Works Accounts is one to be made in accordance with the use to which the accounts will be put.

For Works Accounts purposes the advantage of a common period of account is well recognised, and the only difficulties lie in maintaining agreement with the financial accounts at periods short of the full year, when special adjustments have to be made in any case.

It is quite usual in works accounts for the wages accounts to be kept in periods corresponding with the wages payments, that is, by weeks, and for the material accounts to be kept in accordance with purchase accounts, that is, by calendar months. This is the line of least resistance, but the supreme objection is that the use of Works Accounts for administrative purposes then becomes very limited indeed.

To allow full scope in the application of Works Accounts, a common period for each division, Materials, Disbursements, and Wages, is essential.

Where the principle of a common period for Works Accounts is accepted, it is not unusual to adopt two periods of four weeks and one of five weeks, thus at each quarter end agreeing with the calendar.

To adopt a uniform " month " of four weeks means losing touch with the calendar all the year round, whereas to adopt a fortnight as the Works Account period ensures synchronising with the calendar at the half-year when it is highly important to prepare an approximate *Profit and Loss Account* for the six months.

The fortnightly period gives the requisite uniformity for purposes of comparison, and while the period is short for some comparisons, still it is quite long enough for the adequate control of expenses. The more important comparisons, or surveys, as they may be called, while they may be made up each fortnight, derive their value by what they disclose as to the net position to date, coupled with the tendency at the moment as indicated by comparison of the latest fortnight's return with preceding ones.

Works Account Periods.

Apart from administrative uses of the Works Accounts, the shorter the account period the easier it is to agree the Cost Allocation Accounts. This consideration is a vital one, and costing systems that do not provide for a strict agreement between expenditure and allocation are unreliable. They may be better than no system at all, because conscientious cost clerks can be found, and in such hands some useful figures may be obtained, even though it be impossible to verify the figures with any exactitude.

Obviously a Works Accounts system that is to agree with the Financial Accounts, which are subject to such complete auditing, should prove its accuracy as it goes along. From this point of view a fortnight is a very satisfactory period.

The most serious objection that can be urged against fortnightly agreement of the Works Accounts is the trouble and expense of tabulating the figures for obtaining the necessary totals, and in the very tabulation of which more errors may be introduced than exist in the accounts themselves.

Fortunately, invention and enterprise, more particularly American, have furnished us with machinery by which all the brain fag and eye-strain of tabulating is practically eliminated, so that errors from that source are infinitesimal, and a pull of a lever or turn of a handle, or mere inspection gives us our total. All this is done so much more rapidly than the fastest bookkeeper could write down and then tot up, that to ignore these facilities in devising a system of accounts would be just as reasonable as discussing correspondence methods and ignoring the perfection of typewriters.

We are all past the day of questioning the profitableness of the typewriter—the machine, not the operator—but the initial cost of adding or calculating machines of the kind that really influences the whole bookkeeping routine, is prohibitive to many. The deep-rooted objection to these machines amongst the rank and file of office staffs is due to the fear of unemployment for some of them as the result of its introduction. If, however, the view-point were taken by employers and employed that such machinery as is under consideration should not be used to reduce staff so much as to increase the general efficiency of the business, as the outcome of the Management having prompter and more instructive figures, then the necessary spirit of co-operation may be evolved that will allow the unfettered development of administrative efficiency. The success of the business is the primary essential to the welfare of the staff.

Works Account Periods.

There may be a distinct gain in some businesses if the calculating work is concentrated in one office similarly to correspondence, without precluding the use of a machine in, say, the Drawing Office itself. There is a bureau which undertakes calculations of all kinds by contract, a service of obvious value in such work as stocktaking.

Section IV b

Works Expenditure Account.

Outline of Works Expenditure Account.

WORKS expenditure has reference to the whole expenditure controlled by the Works and dealt with through the Works Accounts.

The works expenditure totals have to be duly accounted for by various periodical reports from the Works Accounts Office to the Financial Department.*

These reports require to be three in number, viz. :

Works Cost Allocation Abstract.
Works Products Abstract.
Works Accounts Annual Abstract.

It will be understood that these reports are all Works Account Abstracts, and present the net result of the whole range of those accounts. This arrangement constitutes a complete interlocking of the Works Accounts with the Financial Accounts. The scope and character of these abstracts are the subject of a concluding section on Works Accounts, when their purport should be fully appreciated.

It is necessary to keep in mind that the Works Expenditure Account comprises virtually a register of the items to be accounted for by the Works Accounts. In that sense they overlap the financial accounts, but the duplication and amplification will be found to justify itself fully by providing the Works Accounts Office with a record of expenditure that can be expressed or analysed in a form explicitly adapted to the requirements of the Works Accounts—a matter of primary importance in releasing works accounting from the restrictions inherent in financial accounting if the latter accounts are properly condensed.

The Works Expenditure Account serves then to transform or translate the figures of the Financial Accounts as to expenditure to meet Works accounting requirements.

Works Expenditure falls into two classes having reference to either goods received or services received.

The first class, " goods received," is synonymous with " Material " in the ordinary accounting sense, while the second class, " services received," is conveniently divided under the two heads of " Disbursements " and " Wages."

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* This description is adopted for purposes of discussion only. The department is likely to be known as either the General Office, the Counting House, or the Accounts Department.

Outline of Works Expenditure Account.

Sometimes no distinction is accorded in the accounts to Disbursements, and they have consequently to be included under the heading either of Materials or Wages. The deciding factor is usually that services for which an account is rendered by an outside party are included under Material and any other under Wages.

By forming a separate division for Disbursements, in both the Financial and the Works Accounts, more consistency will be given to the routine generally.

The main advantage, perhaps, is that the Materials routine can be restricted to actual goods, while the Wages routine can be confined to men paid through the regular Works wages channels.

It is advocated that Disbursements shall include such items as Rent, Rates, Taxes, Insurance Premiums, Staff Salaries, Wages of Workmen employed away from the Works, and Outward Transit Charges, in addition to the usual petty disbursements.

In the case of staff salaries and weekly standing wages, their inclusion in Disbursements allows better for the requisite privacy as to the rates of pay, and, in a lesser degree, as to the allocation of the pay.

There is the further point that salaries usually are paid up to the end of the week, while the workmen's wages are only paid up to the preceding Wednesday or Thursday.

With regard to the wages of workmen employed away from the Works, the making up of the Works Wages Book is facilitated by excluding away time, except, perhaps, for gangs of men sent away to continue work started virtually in the Works, as for a warship's trial. There will also be some advantage in away time wages appearing as Disbursements, instead of Wages, in the cost allocation accounts because there will be no shop charges to be applied.

In the matter of Outward Transit Charges, their inclusion under Disbursements is quite in line with the principle advanced. On the other hand, the inferred exclusion of Inward Transit Charges apparently contradicts that principle, except that carriage paid on goods received may be very well held to be part of the purchase price. It would certainly be inconvenient to separate such charges from the Material Account, and, if possible, the charges should be allocated with the purchase cost of the goods.

It may be assumed that all original Works Expenditure can be resolved under the three heads of Materials, Disbursements, and Wages, and the financial accounts are planned on the theory that all expenditure by and on behalf of the Works must be accounted for through the medium of the Works Accounts. There are,

Outline of Works Expenditure Account.

therefore, three Suspense Accounts in the financial books, called respectively :

Works Materials Suspense Account.
Works Disbursements Suspense Account.
Works Wages Suspense Account.

The Works are responsible for exhausting these suspense accounts by periodical abstracts, as already mentioned.

From the point of view of the financial accounts, stock in hand at the end of the year is really Materials in Suspense that is carried forward to the next year's accounts for allocation.

In the matter of Works expenditure that has been allocated to Works expenses, this allocation is duly reported to the Financial Department, but, from their point of view, this is only a primary allocation, and the Works have yet to report the final allocation of these Works expenses to the various items of product, under their respective order references.

It is the final allocation that raises such a volume of queries as to the method of arriving at the proper incidence of the Works expenses. The problem is gone into in some detail under the heading of Shop Charges—Shop Charges being the term adopted for the actual allocation of Works expenses to the product.

There will need to be an account in the financial books called *Works Expenses Allocation Account.* This account is debited with the primary allocation of Materials, Disbursements, and Wages pertaining to Works expenses, and credited with the shop charges as applied to the various orders, or groups of orders. The basis of such credits or adjustments will be the Works Cost Allocation Abstract.

There is another direction in which both a primary and final cost allocation is necessary for the Financial Accounts, and that is in connection with Process Product and Manufactured Stock Product.

The case of Process Product is that there is a primary account in the financial books of the costs allocated to departmental process costs accounts, and these are called *Iron Foundry Account*, *Brass Foundry Account*, *Smithy Account*, and so on.

These process accounts are duly credited with the value of the output of process product, as given in the periodical Works Products Abstracts. These values are in turn debited to *Works Materials Suspense Account.* Process products are, therefore, subject to a further allocation as Materials before the financial accounts can be satisfied.

By these transactions accounts are built up showing whether the rates applied to the output, under the several accounts, show a satisfactory state of affairs.

Outline of Works Expenditure Account.

In the matter of manufactured stock product the accounting routine follows the same lines as just described for process product. The corresponding account necessary in the financial books is called the *Stock Manufacturing Account.*

Works expenditure totals will be further expanded by two other classes of receipts, namely, Returns from Customers and Scrap Recovered from the Shops.

In the matter of Returns from Customers the effect in the financial books of crediting the customer is to reduce the total Sales. It is necessary, therefore, that the *Sales Orders Account* in the financial books shall be correspondingly adjusted.

Goods returned by customers are additional, or new receipts, from the Works point of view, and must figure accordingly as such in the Works Expenditure Account. This is accomplished by the Works Accounts Office reporting to the Financial Department the works value of the goods returned, and on the basis of that report, as incorporated in the Works Products Abstracts, the *Sales Orders Account* is credited and the *Works Materials Suspense Account* debited.

The Works value may be identical with the original cost, but, on the other hand, there may not always be any justification for the Works accepting returned goods at full cost, even when the customer is credited at the original selling price.

Provision is made in discussing the question of Standing Orders, for the cost of restoring returned goods to a saleable condition to be treated as a commercial expense instead of a Works expense. In this event the Works can properly accept returned goods at their full cost price.

In the matter of scrap recovered from the shop these also are additional receipts in that the original material issued to the shops has been transformed in the processes of production into a new form, which, on being returned to the Stores has to be recognised accordingly.

So far as possible credit is passed to the original orders in respect to the scrap, and the value credited will be the value of the scrap as accepted into stock.

If the scrap in question had been material still in the same form and useable for the same purposes as the original material, the accounting adjustment necessary would be merely to reduce the current total issues of stock material by the amount returned.

Seeing, however, that the scrap in question is not returned material in the ordinary sense, its recognition as a new form of stock involves its entry as a new item of works expenditure. This routine regularises the treatment of scrap as receipts, in the stock accounts, under

Outline of Works Expenditure Account.

an appropriate heading, and so obviates cutting across the cost allocation routine and disturbing the straightforward agreement of either the cost allocation or the stock accounts.

The value of scrap recovered from the shops is reported to the Financial Department, being incorporated in the periodical Works Products Abstracts, and from this report the *Works Materials Suspense Account* is debited accordingly. To keep the financial accounts in balance, a corresponding credit is passed to the *Sales Orders Account* as to the scrap values credited to the original orders in the Works accounts, and to a *Scrap Account* as to scrap values not so credited.

The total amount credited to the *Scrap Account* is ultimately transferred to the benefit of the *Works Profit and Loss Account.*

The elements entering into the Works Expenditure Account may be tabulated as follows :

WORKS EXPENDITURE ACCOUNT.

Materials.	Disbursements.	Wages.
Purchased Goods. Inward Transit Charges. Process Product. Manufactured Stock Product. Returns from Customers. Scrap recovered from Shops. *Less* Purchase Credits (Returns, etc.)	Services received. Staff salaries. Wages of men employed away. Outward Transit Charges. Petty Disbursements.	Workmen's Time Wages together with any Extra Pay (Piecework Balances or Premiums) and Special Allowances.

Works Expenditure Book.

The form in which the Works Expenditure Account can be best kept is in that of a book to be called the Works Expenditure Book, 5-115. with provision for analysing the items on the lines of the Works accounting system generally.

The majority of the entries will necessarily be derived from invoices for goods purchased. There will be other invoices or statements received referring to disbursements, which may be termed Ledger Disbursements, in contradistinction to Petty Disbursements made through the Petty Cash medium.

The Works Accounts Office will require to be specially advised by the Financial Department of Petty Disbursements, in the absence 5-120. of an invoice or its equivalent, and this can be done on the Cash Report to Works.

It will occasionally happen that goods are purchased through the Petty Cash, and such purchases will have to be included on the Cash Report to Works as Cash Purchases. These will be dealt with, so far as the Works accounts are concerned, exactly the same as ordinary or ledger purchases.

Works Expenditure Book.

Salaries is another item to be incorporated in the Cash Report to Works.

In the matter of wages, as the Works Accounts Office prepare these figures, they will enter the weekly totals direct into the Works Expenditure Book, but it will still remain desirable for the amounts to be included in the Cash Report to Works by way of confirmation. 5-116.

Other entries in the Works Expenditure Book will be necessary for Process Product, Manufactured Stock Product, Goods Returned from Customers, and Scrap Recovered from Shops. 5-118. 5-119.

In arriving at the style of the sheets for the Works Expenditure Book, it is necessary to embody the main divisions to be carried through the Works accounts.

The divisions advocated can be indicated here without anticipating the discussion given further on in connection with each division.

The group of expenditure elements given above under Materials will require to be divided under five heads for Works Accounts purposes, viz.:

Purchases charged direct—being materials appropriated in advance to specific orders.

Process Product charged direct.

General Stock—being materials of a general character passing into stock, of which the essential subdivisions are Raw Materials, Shop Supplies, Hardware.

Component Stock—being components, either loose or assembled, passing into stock. There are five essential subdivisions, viz. Standard Fittings, Rough Components, Components for Assembling, Spare Components, Complete Product.

Returnable Packages.—Analysis under this head is necessary to facilitate the accounting in this connection.

Coming to **Disbursements,** no subdivision is necessary, usually, for Works account purposes.

With **Wages,** two subdivisions will be found very convenient, viz.:

Time Wages. Extra Pay and Allowances.

Purchases.

So far as the Works Expenditure Account is concerned, purchases are virtually synonymous with invoices. Once the Purchase Order is issued the accounting routine is a matter of passing the invoice.

There are a matter of seven stages in the passing of an invoice, and it will be convenient if a rubber stamp endorsement is applied to each invoice with provision for these stages to be certified as follows:

Invoice No.	Agreed with Purchase Order.	Prices checked.	Calculations checked.	Goods received in good order.	Noted for Works Accounts.	Passed for Ledger.

Purchases.

Some consideration is necessary of these stages.

Invoice Number.

The numbering of invoices is best done when the invoices are completely passed and ready for entry in the Works Expenditure Book.

The numbers will be allotted by the Works Accounts Office, and there should be no difficulty in entering the invoice totals in the financial books in numerical sequence. This will ensure that the Financial Department will receive all invoices accepted by the Works Accounts Office.

The numbers used can very well start at 1 each year, and run on during the course of the whole year.

The invoice numbers will be entered on the respective Goods Received Notes concerned.

Agreed with Purchase Order.

This stage is of distinct importance as ensuring the effective regularising of purchases.

In the case of goods ordered by telephone, this procedure will ensure that an official confirmation order is issued in every case. Some responsibility attaches to the supplier in this connection, but it is not safe to rely on him pressing the point of obtaining a written confirmation of a verbal order, whether given by telephone or personally. In the latter case particularly, when responsible officials give a verbal order for goods, it is hardly reasonable to put the onus on the supplier of obtaining confirmation. If the routine is such that an official order has to be made out, although not necessarily posted to the supplier, before the invoice can be passed, it will greatly help the Management to control matters.

Prices Checked.

To efficiently check prices means continuous care in the issue of the Purchase Orders. Each order should state the terms of purchase as clearly as possible.

As a matter of abstract principle prices should be checked by a department that is not responsible for purchasing.

To apply this theory is not always convenient, and difficulty is sometimes made over the consequent need of informing the Works Accounts Office, which presumably should do the checking, of the terms of purchase when there may be reasons for not stating them on every order.

Whatever authority may be vested in the Buyer it is wholly desirable that the prices at which he purchases should be subject to a certain amount of independent criticism. The criticism can only be effective when associated with the power of holding up the invoice from payment. The Works Manager will be the officer to whom the Works Accounts Office will submit their price queries.

Extensions and Totals Checked.

No comment is necessary in this connection unless to remark that this checking should not be done perfunctorily.

The net invoice amounts will require to be entered on the respective Goods Received Notes, thus allowing the invoice to go forward to the Financial Department, and for the Works accounting to be carried out from the Goods Received Notes. The totals of each invoice are, of course, duly entered in the Works Expenditure Book and analysed under the following heads:

Purchases charged direct. General Stock. Component Stock. Returnable Packages.

Goods Received in Good Order.

For the Works Accounts Office to certify as to this stage, it is necessary that they have a Goods Received Note, duly signed as to quantity and quality of the goods in question. It is quite important that such a report should be furnished for every receipt of goods, and to ensure the maintenance of the routine, the respective Goods Received Note number is quoted by the Works Accounts Office on each invoice.

Noted for Works Accounts.

This might almost as well be expressed as "Entered in Works Expenditure Book," for that is what it amounts to. Once the entry has been made in that book, there can be no question of ultimate allocation in the Works Accounts.

The actual Works Account references are entered in the Works Expenditure Book and this meets the requirements of auditors, assuming that proper agreement is effected between the Works Expenditure Account and the corresponding financial accounts.

Passed for Ledger.

This final stage in the passing of an invoice is carried out by the Financial Department. It is in effect a passing for payment, but is better expressed in the way indicated to avoid confusion with the passing of accounts for payment by the Directors.

In the case of goods supplied on approval, an official Purchase Order should be passed, but the invoice should not be entered in the Works Expenditure Book until the goods are finally accepted. **Purchases.** 5-15.

It may be remarked here that invoices held over for the above or any other reason, and Goods Received Notes awaiting invoices, can be advantageously held in what is sometimes called a ready sorter, consisting of a number of stout cardboard leaves in book form, lettered alphabetically. This device is a considerable time-saver in connection with the passing of invoices. From its contents, at any time, it will be easy to ascertain details of invoices received but not passed, and of goods received but not invoiced—a vital point at the end of the year. 5-82.

It will save much time and benefit the accounts generally if the Works Accounts Office prepare early each month a statement showing the invoices held up and the reason for same, and a further statement detailing the goods received for which invoices are not to hand. The latter statement may be advisably anticipated by the Works Accounts Office sending out postcards for invoices not to hand as this becomes apparent by looking through the waiting Goods Received Notes—say weekly.

In the case of goods received on loan, a carbon copy of the Acknowledgment of Goods Received Form will be a more distinctive medium than a Goods Received Note, though otherwise treated the same. 5-83.

Reference may be made in passing to the relation of cash discounts to the Works accounts.

Cash discounts allowed by suppliers pertain to the financial accounts and are outside the range of Works accounts, or even of the *Works Profit and Loss Account* in the financial books—falling in to the general or final *Profit and Loss Account*, together with cash discounts allowed to customers.

Any discount outside the strict definition of cash discount is to be treated as a trade discount and deducted from the invoices concerned, or possibly as a separate purchase credit, such as may occur, when special discounts or rebates are allowed according to the volume of business in a given period.

It is almost unnecessary to mention that the Works Accounts Office must be instructed as to invoices that have to be passed to the Financial Department within a specially short period to obtain an extra cash discount, or to prevent interest being charged if not paid by a specified date.

When an invoice has to be passed for this reason without a complete Goods Received Note being obtainable from the Works—

Purchases. complete, that is, as to inspection, for in all else the report should be in proper order—the invoice should be endorsed plainly by rubber stamp "Passed without inspection," and a note made accordingly against the particular entry in the Works Expenditure Book. The Works Accounts Office will be responsible for seeing
5-98. that this memorandum is duly satisfied by a Viewing Report from the Works.

Where the rule is general to pay accounts within a few days of date of invoice to obtain an extra cash discount, the General Stores should not detain Goods Received Notes, pending detail inspection of the goods, if this cannot be effected within, say, twenty-four hours. In that case the Goods Received Note should be sent, not later than the day following receipt of goods, to the Works Accounts Office boldly endorsed "Viewing Report to follow." The Works Accounts Office can use their discretion as to passing on the respective invoices at once to the Financial Department duly marked as already suggested.

When goods are bought for cash, instead of through a ledger account, no difference should result in the works accounting routine beyond the fact that the entry in the Works Expendi-
5-120. ture Book would be derived from a Cash Report to Works, as furnished fortnightly by the General Office, instead of from an invoice.

A point might be made as to the disadvantage of cash purchases, so far as the General Stores routine is concerned, in that no Purchase Order is created and the routine as to the Goods Received Note is incomplete and sometimes confusing, having to be made good by the Cash Report to Works. This, of course, is particularly likely to be the case if purchases from any supplier are sometimes for cash and sometimes for ledger account. This state of affairs is apt to occur with purchases from local tradesmen and is to be avoided. There will probably be an economy effected in the long run if local purchases have to go through the full routine of a ledger account.

Returnable Packages. In the matter of returnable packages, to put the accounting on
5-84. a proper footing, it is very desirable to institute a Returnable Packages Card. A card will be made out in the Works Accounts Office for each package charged for, and these cards will be passed to the General Stores that they may be in a position to know what packages will be credited if returned, and also whether the charge made for the package is such as to fully justify the carriage necessary to return it.

With this information in their hands they are enabled to make out a Returns Note, suitably endorsed by rubber stamp or printing, that will serve to notify the supplier of the amount of credit due on the returned case. It is assumed that the Works Accounts Office will receive a copy of all Returns Notes so that they can make the necessary entries in the Works Expenditure Book (Credit Section), and pass the Returns Notes on to the Financial Department for posting to the respective suppliers' accounts. **Returnable Packages.** 5-113. 5-117.

The following is a suitable endorsement for these Returns Notes :

> "Please credit our account with the empty packages returned as per particulars above. An acknowledgment will not be necessary if you agree with our figures. Please note that we hold the signature of Carman................should it be necessary to take up the matter with the carriers on account of non-delivery."

While there should be no omission to return promptly all packages that it is intended to return, it is necessary to keep a Suppliers' Package Record of how matters stand with each supplier individually. Only packages that are returnable will appear on these records. 5-122.

When a package is charged that is not returnable, the only simple course is to include such charge as part of the cost of the goods contained therein, and to give the despatching expenses the benefit, if the package can be used for sales purposes.

It is as well to see that all charges made for unreturnable packages are reasonable.

The Suppliers' Package Record will have entered on it all returns of packages, and will require to be adjusted as to any returnable package which it has been decided not to return. The Works Accounts Office will derive their information as to decision not to return any package by receipt of the Returnable Packages Card marked accordingly.

Outstanding items on the Suppliers' Package Records can be made the subject of enquiry by the Works Accounts Office, who may thus check the stores work in this connection.

If packages are looked after in this way, there need be no occasion to differentiate packages in the Bought Ledger, and the accounts each month can be settled in full without deducting packages. The margin of packages that may get paid for one month only, to be credited later, will be too small to disqualify the arrangements proposed.

The Financial Department can make reference to the Suppliers' Package Records, if need be, before paying any account.

In discussing the passing of invoices no reference has been made to the procedure occasioned by inability to accept a supplier's invoice through some query. **Purchase Credits.**

Questions relating to prices charged are usually of a nature

Purchase Credits.

requiring a letter, but, generally speaking, invoice differences can be cleared up most effectually and rapidly by sending a specific claim to the Supplier for the difference in question. Particular attention must be paid to giving all the requisite information, and, in the case of goods returned, to quote the Returns Note reference.

The usual practice is to render this claim in the form of a Debit Note. This accomplishes all that is necessary from the purchaser's point of view, but the method is blunt and does not sufficiently indicate by its style the necessity for a credit note to be sent by the supplier. The purchaser is not so much concerned to receive a Credit Note as to know that the credit has been duly allowed in the supplier's own books of account.

There are certain claims for credit that call for mutual agreement and yet to depend on reaching an agreement by correspondence means waste of time and holding back invoices from entry in the account books.

The manner recommended, therefore, for making these claims
6-14. is to issue a Credit Claim Note to serve as a Debit Note. The title allows a wider application of the form and can include tentative claims ; it also allows a less blunt though not less effective wording of the claim. The Credit Claim Note can be phrased as follows :

> "We have to notify you that we have provisionally debited your account with the amount given below for the reasons stated, and shall be glad to have your Credit Note confirmation per return."

It will usually be found best to have Credit Claim Notes made out in triplicate by the Works Accounts Office. The top copy will go to the supplier and the second to the Financial Department.

The Works Accounts Office will enter each claim in the Works
5-117. Expenditure Book (Credit Section). Credit notes received from the suppliers in response to Credit Claim Notes will remain with the Financial Department, and only be referred to the Works Accounts Office when there is disagreement with the credit claimed or no corresponding Credit Claim Note. This arrangement is good in stimulating the Works Accounts Office to look properly after obtaining all purchase credits to which the firm are entitled.

The Financial Department may hold the Credit Claim Notes two or three days before posting the amounts to the respective suppliers' accounts. This will give the supplier a chance to dispute or confirm the claims.

The invoices in connection with which credit claims are made at the time of passing the invoice, should be plainly endorsed by rubber stamp, giving the requisite reference and amount of claim.

In regard to claims for shortages in weights, these will be the more readily enforced when the weighing machine used for the receipt of goods records each weighing.

Purchase Credits. A point may be made as to the procedure when goods are received that require correction. Under any ordinary circumstances the goods should be returned to the supplier, carriage forward, for correction. If, however, time or any other reason makes return undesirable, and the purchaser elects to make the necessary correction himself, it is important that he come to terms with the supplier beforehand as to the credit to be allowed.

Coming to the question of rejected goods, it will be found a much safer practice to claim credit for each return, and to issue a regular Purchase Order for the replacement, if replacement is required. This procedure will bring the replacement into the regular routine for following up delivery.

Under this arrangement all replacements will be charged for, and there is, therefore, a need to embody in the replacement orders the Returns Note reference of the goods returned to ensure that no invoice is accepted for replacements unless credit has been claimed for the rejected supplies.

When dealing with a supplier who prefers to replace free of charge and not to credit the rejection, it may be necessary to create a dummy invoice, and make an entry to cancel the Credit Claim Note. This occasional trouble will not discount seriously the gain to the Works Accounts and the Financial Accounts in having no credits held up, or the advantage to the General Stores as to having replacement orders handled through the regular channel.

In the event of a supplier making an error in an invoice against himself, it is only right that he should be notified by letter. The letter should be no more than a notification that a certain item is not agreed as to quantity or calculation—leaving the supplier to investigate matters for himself. It is doubtful if any notification should be sent of undercharges, in regard to prices, unless of a glaring character, in case the lower price should be intentional.

Disbursements. Disbursements differ from purchases in that they cannot very well be passed from an equivalent of the Goods Received Note except it be created in the Works Accounts Office.

5-121. It will, therefore, be necessary to have a Disbursements Book in which the various charges can be entered in detail, and approving signatures obtained therein from responsible officials before any debit is accepted as regards the Works Accounts. This book will be of considerable value for reference purposes from year to year, if appropriately indexed, and should ensure no account being passed twice. Each invoice treated through this channel must be clearly marked as " Disbursements."

Petty disbursements and cash disbursements such as salaries

Disbursements.

appearing on the Cash Reports to Works, will not come within the scope of the above book.

Outward transit charges, although probably in the category of Disbursements for the most part, will not require to be entered in any detail in the Disbursement Book.

Rating.

One considerable item in the way of disbursements is that of rates, as levied by the local authorities. The method of assessment varies in different districts, and the manufacturer needs to give the matter more than ordinary attention. The question is one, indeed, that individual manufacturers are hardly able to deal with properly, and out of their necessities has arisen the Machinery Users' Association, by which joint action is possible and through which expert advice can be obtained.

The unfair burden that arbitrary rating of machinery has thrown on the manufacturer has made it necessary for the aid of legislation to be sought to put matters on an equitable basis. To this end the Machinery Users' Association are identified with seeking the enactment of a bill on the following lines for England—Scotland and Ireland having already got such an arrangement.

PROPOSED
RATING OF MACHINERY BILL.

A BILL TO

AMEND THE LAW RELATING TO THE RATING OF HEREDITAMENTS CONTAINING MACHINERY.

Whereas questions have from time to time arisen as to how far machinery is to be taken into consideration in estimating the rateable value of the premises in which any trade, business, or manufacture is carried on, and it is expedient to amend the law relating thereto:

Be it therefore enacted by the King's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:

1. From and after the *passing of this Act* in estimating for the purpose of any valuation list, or poor or other local rate, the gross estimated rental or rateable value of any hereditament occupied for any trade, business, or manufacturing purposes, any increased value arising from machines, tools, or appliances which are not fixed or are only so fixed that they can be removed from their place without necessitating the removal of any part of the said hereditament shall be excluded.

Provided that the gross estimated rental of any such hereditament shall be estimated at not less than the sum at which it might reasonably be expected to let for the purpose for which it is used on a tenancy from year to year void of the machines, tools, and appliances which it might reasonably be expected would be supplied by the tenant, if the tenant paid all the usual tenant's rates and taxes and if the landlord undertook to bear the cost of the repairs and insurance and the other expenses (if any) necessary to maintain the said hereditament in a state to command such rent.

Provided also that the terms machines, tools, and appliances for the purposes of this Act shall not apply to any machinery, machine, or plant used in or on the hereditament for producing or transmitting first motive power, or for heating or lighting the said hereditament.

2. This Act may be cited as the Rating of Machinery Act.

Section IV c

Standing Orders.

Function of Standing Orders.

THE primary function of Standing Orders is to classify expenditure under regular headings.

Function of Standing Orders.

Sometimes the Standing Orders are so comprehensive as to include every item of expenditure, but in the ordinary way their use is restricted to expenditure on Works Additions and Works Expenses, with the possible addition of Departmental Process Accounts for Iron Foundry, Brass Foundry, Smithy, and the like, together with certain Works Sundry Accounts of a nature to be explained later.

While there may be a common usage in regard to the total scope of Standing Orders, very different ideas prevail as to the scope of the separate orders, or, in other words, as to the classification. The general tendency is towards crudeness rather than refinement in classification, and this can be well enough understood by remembering that the decision as to allocation of cost commonly devolves on the foremen.

Considering more particularly Works Expenses, it will be easy to realise that a crude classification must result in accounts of small value for administrative purposes, although there may be enough information to satisfy auditors.

A more elaborate classification of expenses will mean a corresponding increase in the number of cost accounts, and in the number of entries in the Financial Accounts.

If the foremen are to be used for applying the classification, elaboration will be unfair to them. As a matter of fact it is altogether undesirable that any foreman should be brought into the question at all, firstly, because cost allocation is not his proper business, secondly, because his obvious limitations in the matter ought not to handicap the development of the classification, and lastly, because open accounts of this character make it almost impossible to efficiently control the Works Expenses.

It ought to be a starting point in drawing up a set of Standing Orders that it is not what the foremen can be expected to do, or what number of accounts may be permissible, but rather what classification of Works Expenses is necessary to give the most useful figures for administrative purposes, and also the most useful figures for the calculation of shop charge rates.

In the case of Works Additions there is another consideration, namely, the best grouping of plant values for the equitable application of average depreciation rates as necessary for financial reasons.

The classification of expenditure for Works Additions should have its complement in connection with Works Repairs so as to furnish useful ratios of one to the other for administrative purposes.

In any case, however, an undue multiplicity of classes, or accounts, must be avoided.

Function of Standing Orders. To take away from the foreman his freedom of action regarding works repairs will not be favourably viewed by him. He will have legitimate ground for complaint if the routine established to exercise control and get repairs put in hand is not carefully devised and administered with intelligent conscientiousness. The appropriate routine for this purpose has been discussed in connection with Plant Sub-Orders, which cover Buildings, Fixed Plant, and Loose Plant. See Section III e.

The author's own experience of the tremendous savings, actual and proportionate, resulting from the withdrawal of standing orders from the shops and the institution of specific orders for each and every expense job, enables him to advocate these measures despite the first opinions of the foremen and the extra stress on the administrative forces. A little compromising is necessary for certain minor repair charges.

Plant Sub-Orders. 5-96. If the principle of specific Plant Sub-Orders for works additions (Series N) and works repairs (Series R) be adopted, a very simple compromise will meet the case of minor repairs and plant attendance that consist of a succession of jobs too small, for the most part, to justify specific orders. These cases are very well met by the issue of fortnightly orders corresponding with the Standing Orders concerned or subdivisions of them.

A point of some importance is to provide for plant alterations and renewals being dealt with on their merits as to their effect on capital values.

Even seemingly obvious additions should not be added to capital values without due consideration, and, this being so, the routine is recommended of issuing Plant Sub-Orders (Series N) for all Works additions, renewals, alterations or improvements, in fact, for any expenditure not clearly repairs.

The individual costs under these orders can then be reviewed, say, fortnightly, by the General Manager in consultation with the Works Manager and Works Accountant.

The costs to be reported to the Financial Accounts as Works Additions will be decided on and the balance transferred to suitable expense account, viz. Plant Renewals and Alterations, or Works Repairs.

This routine should also obviate any risks attaching to the use of the term improvements. Improvements do not always, perhaps rarely, justify any increase in capital values. Their most usual effect is to postpone obsolescence, for which ordinary depreciation rates do not provide, and expenditure on improvements may, therefore, only be an alternative to writing down the capital value

Plant Sub-Orders.

of the plant in question. To maintain the book or capital value unchanged after an improvement might be tantamount to increasing the book value when compared with the true value figure for the machine in its unimproved state.

Loose Plant and Office Equipment being subject to valuation each year do not need to come under the above arrangements as to review.

Standing Order Numbers.

Mention has previously been made of the series of numbers suggested for Plant Sub-Orders, and it will be convenient to use the symbols, agreeing with those suggestions, in the representative lists of Standing Orders to be detailed in the following pages.

This means using

Symbol N for Works Additions Standing Orders.
,, R ,, Works Repair Expense Standing Orders.
.. S ,, Works General Expense Standing Orders.

Attention is directed to the method of numbering the orders by the use of " hyphen " or " dash " numbers, the group number being followed by a series number—and the combination preceded by a symbol as above, thus N 1-1, N 1-2, N 1-3.

So far as possible the groups consist of related classes of expenditure. There can be any number of groups under the same symbol reference, and additional accounts can be opened without disturbing the group sequence.

The extent to which the Standing Order Accounts should be subdivided can hardly be suggested without a very intimate knowledge of local conditions and requirements.

Where departmental subdivisions are necessary, there is the less likelihood of other subdivisions being necessary, and it will be admissible to add a letter symbol representing the department, thus S 6-2A. Subdivisions under other headings can be indicated by small letters as S 3-2a.

In attempting to detail a representative list of Standing Orders, no pretence can be made as to their suitability for every or any works, but it is thought some useful purpose will be served by discussing a list that is founded on actual experience in a number of works in this country.

In the case of Works Additions, which will be considered first, the Standing Orders will not apply so much to the cost accounts themselves as to the summarising of the Plant Order costs, preparatory to their inclusion in the financial accounts. 5-137.

Works Additions.

Works Additions—Representative Standing Orders.

Refer also Buildings and Fixed Plant Classification—Section IVk.

N 1-1, Patents, Drawings and Patterns.

The inclusion of Patents in the title is rather to agree with the Financial Accounts than for Works Account purposes, as Patent transactions will not usually come into the latter.

As already recommended, Drawings and Patterns should be made under the original Sales or Stock Manufacturing Order concerned, and only a proportion of the cost, if any, depending on the likelihood of repeat orders, should be transferred to Works Additions under this account.

N 1-2, Jigs and Special Tools.

This is a short title intended to cover Jigs, Fixings, Gauges and any tools that are quite special to the line of product for which used.

The remarks above *re* Drawings and Patterns entirely apply here also, with the further point that only quite a small capital value should be placed on jigs and special tools where there is the least chance of even slight modifications of designs. Alternatively, when circumstances necessitate capitalising a large expenditure, a very high rate of depreciation should be allowed. Jigs and special tools so easily become obsolete, and being necessary for replacements, cannot very well be modified, if it were possible to do so. Their possession then becomes more of a tax than an asset.

N 2-1, Land and Buildings.

This will include Fences, Roads, Tramways, Gauntries (when built in) and Machinery Foundations. The inclusion of the latter here is better in that such foundations become an integral part of the building and not of the machinery. Some care is necessary to adjust the book values when special foundations become useless through removal of machinery. If the cost of new foundations is included in the cost of removal and charged to Works expenses (Standing Order S 2-6), little adjustment, if any, may be necessary of book values (Building numbers should be allotted as required and quoted in the accounts).

N 2-2, Motive Power Plant.

This is intended to include all kinds of power generating plant, though subdivisions may be possible in some Works, such as between steam power and electrical power—in other Works as between separate power stations.

N 2-3, Mechanical Transmission.

This will include the chain or spur gearing leading to the line shafting together with the line shafting and pullies, but not belting or ropes. Chains would be included here as being an integral part of the gearing and long-lived.

Countershafting should be included with the machine concerned.

N 2-4, Electrical Transmission.

This will include cables, switches and the like, together with the electric lighting system—the latter possibly as a subdivision.

Motors are held to be better placed under Motive Power Plant.

N 2-5, Pipe Transmission.

This is intended to include all kinds of pipe systems with their valves and connections.

Typical pipe systems are those for Steam, Water, Gas, Air and Suds.

Fans and blowers should be included here together with the rest of the fixed equipment pertaining to Heating, Ventilating, Gas Lighting and Fire Prevention.

Power plant pipes within the Power Department are more conveniently included under Motive Power Plant.

N 2-6, Transportation Plant.

This will include Cranes, Runways, Lifts, Locomotives and Rolling Stock.

Loose lifting tackle will come under Loose Plant (N 3-1).

Though not quite within the title it will be convenient to include fixed weighing machines or weighbridges here. Portable weighing machines will come under Loose Plant.

N 2-7, Shop Fixtures.

This will include what valuers often term trade fixtures and fittings, and obviously the character of the trade will determine the nature of the items to be included. The more typical items are benching, shelving, shop partitions (when not considered as part of the building), permanent store fittings and the like. Foremen's offices will usually be included here.

Works Additions—Representative Standing Orders, contd.

N 2-8, Special Process Plant.

This might almost be called a miscellaneous account, and may have to be called that in some cases, though such a title is not desirable.

The account will include such plant as Heating Furnaces, Smithy Hearths, Core-stoves (if not part of a building), Sand-blasting, Oxy-acetylene Apparatus, and so on.

N 2-9, Machines.

The scope of this account will be fairly obvious, though a variation from common practice is advocated, as to the accessories purchased with each machine, such as chucks and faceplates.

For control purposes and also for reasons of depreciation, machine accessories of this character should be valued as Loose Plant and not included in the machine values. Much confusion results in Loose Plant inventories otherwise.

The practice is also recommended of including belting with Loose Plant rather than with the machines because the upkeep of belting is a matter quite apart from the machines themselves. Considered as an item in the cost of installing a machine (which, except as to foundations, belongs to this account), belting is too small a proportion of the whole for it to matter seriously whether the initial belting is charged here or treated from the start as Loose Plant.

The separation of belting attendance, that is, repairs and renewals (S 2-4) from machine repairs (R 2-6) is, in any case, very desirable.

Installation Costs should be charged here, but under a sub-heading, similarly with other plant. Loose Machine Guards may be charged to N 2-7.

N 3-1, Loose Plant.

The items covered by this account will be fairly obvious, due regard being paid to the exclusion of Jigs and Special Tools (N 1-2), and the inclusion here of Machine Accessories and Belting referred to under Standing Order N 2-9.

The cost of packages built for regular service, such as between the Works and outside foundries, should be charged here.

Departmental sub-accounts will be useful, though it would possibly be equally or even more useful to have sub-accounts under the group headings suggested further on for the classification of Loose Plant, viz.:

1. Belting and Driving Ropes.
2. Gauges and Mechanical Measuring Appliances—Standard.
3. Hand Tools—Engineers.
4. Holding Appliances for Cutting Tools.
5. Holding Appliances for Work.
6. Machining Tools.
7. Ordinary Implements and Utensils.
8. Portable Mechanical Appliances.
9. Portable Shop Accessories.
10. Special Trade Tools and Accessories.
11. Testing Gear.
12. Transportation, Lifting and Weighing Apparatus.

It is not easy in the case of Loose Plant to discriminate between additions and renewals.

Where there is any doubt the expenditure should be considered as renewal and charged with repairs (R 3-1).

It is possible for an item that was additional in the first instance to prove before the next inventory to be a renewal by reason of the scrapping of one of the original stock or supply, to which the new one seemed at the time to be an addition.

N 3-2, Office Equipment (Works).

It is advisable to treat all office equipment as loose, and therefore as requiring an annual inventory, although some of the items such as shelving, electric light fittings and linoleum are of a fixed character, and would be subject to regular depreciation.

All equipment of all offices pertaining to the Works Administration, including Drawing Office and Works Accounts Office, will be included here. The equipment in foremen's offices is better included under N 3-1 as Portable Shop Accessories.

N 3-3, Office Equipment (General).

This account will deal with the equipment of all offices outside the Works Administration.

Exhibition fittings can advantageously be included here, though possibly as a sub-account.

This account figures in the Works list for the convenience of the Financial Accounts, but only those charges will come through the Works Accounts that refer to work actually carried out by the Works.

Works Repairs.

The Standing Orders suggested for Works Repair Expenses will be seen to be parallel to those for Works Additions. This arrangement will provide for computing the ratio of repair expense to plant values under the respective headings.

Attention is called to the fact that the term "maintenance" is rigidly avoided in connection with plant expense (except for Patterns, Jigs and Special Tools) because its meaning can be made to vary so much.

Considered in its fullest sense, maintenance includes repairs and attendance. Separate accounts are recommended for attendance (S 2-1, S 2-2, S 2-3, S 2-4, and S 2-5) which will be found to give added value for administrative purposes to both sets of figures.

The question of renewal expenses has been considered in connection with additions. Building and Fixed Plant renewals will be dealt with under special Plant Sub-Orders and finally allocated on the merits of each case to additions or repairs. Loose Plant and Office Equipment renewals will be, in the first instance, allocated as repairs, as being subject to annual valuation, which will automatically adjust matters as to the effect on capital values.

Works Repair Expenses—Representative Standing Orders.

R 1-1, Patterns.

R 1-2, Jigs and Special Tools.

The charges falling under these two accounts may be derived in part by transfer from the Pattern and Special Tool Maintenance Costs under various Sales and Stock Manufacturing Orders, which it may be decided to relieve in this way.

Maintenance is conveniently used here as covering any upkeep expense after the initial expenditure for making, but not such matters as storage and handling.

R 2-1, Land and Buildings.

A separate sub-account for the Power Department Building will be convenient for shop charge purposes, if feasible.

Some discrimination will be necessary as to certain expenses, such as painting, whether they shall be dealt with here as repairs or under Building Attendance (S 2-1).

Painting and tarring that is done to preserve the fabric would seem to be repairs. Painting done to improve the lighting capacity had also better be included here, and the cleaning of same treated as Building Attendance.

It may be remarked that a clean white surface will reflect some 80 per cent. of the light and almost equals mirrors in lighting efficiency—good mirrors reflecting 90 per cent. of light.

In the case of washable distempers lasting two or three years, the initial cost can be treated like painting as repairs.

Ordinary limewashing seems clearly a Building Attendance expense.

R 2-2, Motive Power Plant.

R 2-3, Mechanical Transmission.

R 2-4, Electrical Transmission.

Under most conditions there will be little advantage in attempting separate sub-accounts for each department concerned under the above headings.

For shop charge purposes the costs under these accounts can be considered as pertaining to Power Service, and consequently can be fairly apportioned to departments on the basis of power consumed.

Works Repair Expenses—Representative Standing Orders, contd.

Works Repairs.

R 2-5, Pipe Transmission.

R 2-6, Transportation Plant.

R 2-7, Shop Fixtures.

For shop charge purposes the above expenses are included in Building Service, and apportionment to departments on the basis of original plant values is suggested.

It may, of course, be better in some cases to keep departmental sub-accounts under each heading.

R 2-8, Special Process Plant.

R 2-9, Machines.

In connection with these two accounts, departmental divisions will probably be desirable, particularly as regards Special Process Plant.

Judgment will be necessary as to whether to use such departmental figures for shop charge purposes or to apportion the total expenses on the basis of original values of plant.

R 3-1, Loose Plant.

All tools other than Jigs and Special Tools are included here.

Renewals are included here without the scrutiny necessary for Fixed Plant additions because the capital value of Loose Plant is derived from an annual inventory.

Attention is called to the separate account (S 2-5) proposed for Tool Dressing and Sharpening Expenses, which are not deemed to be repairs within the meaning of this account.

A further point may be made as to what may be called "consumable tools," such as Brooms, Brushes, Files, etc. While these for inventory purposes come into Loose Plant, it will be better that, during the year, they shall be treated as Shop Supplies and charged to a suitable account (S 6-2) as drawn from stock.

Separate sub-accounts for each department may be useful, but apportionment of the total expenses on a replacement value basis will probably be more accurate for shop charge purposes.

R 3-2, Office Equipment (Works).

A parallel to Shop Supplies in relation to Loose Plant exists here on a minor scale in respect to certain stationery items, such as cardboard filing cases, index guide cards, rubber stamps, etc. They should be charged to a separate account (S 3-4) during the year, and the items in use possibly enumerated in the annual inventory, though there are limits to what is worth while doing in that direction.

No provision has been made above for repairs to Office Equipment (General). These are not Works expenses, and are, therefore, kept out of the sequence of Works Expense Standing Orders.

Some provision is necessary for Works accounting purposes, and this will be found in the Works Sundry Accounts group under Repairs to Office Equipment (U 1-2).

Works General Expenses.

The remaining Works expenses to be provided for have been termed Works General Expenses in contradistinction to Works Repair Expenses.

Works General Expenses.

Works General Expenses—Representative Standing Orders, contd.

S 1-1, Power Generation Expenses.

This will include all wages of Boiler House and Engine House staff.

Similarly, all power supplies, such as fuel, water, oil, etc., will be included.

Unless fuel is bought at very frequent intervals, it is better to consider it as stock and to charge this account, say fortnightly, with the fuel used on the basis of the Power Report.

Fuel handling may possibly be charged direct here, or added to the cost of the fuel.

The influence of repair expenses and depreciation on the cost of generating power is considered in dealing with Power Service in connection with Shop Charges.

S 1-2, Power from Outside Sources.

This will include the cost of power bought in bulk from outside authorities. If for lighting purposes only, the cost may be charged to Lighting Expenses (S 1-4) instead.

S 1-3, Heating Expenses.

There will be cases when these costs are distinct to an extent, if not entirely, from those of Power Generation.

Whatever heating expenses can be differentiated in the first instance should be debited to this account.

Transfers from other accounts can be made, if thought necessary, to make the charges against this account inclusive. This may be helpful in determining shop charge rates.

S 1-4, Lighting Expenses.

The remarks above as to Heating Expenses will apply equally to these expenses.

S 2-1, Building Attendance.

This has reference to work on and about buildings that can hardly be called repairs.

Limewashing, cleaning roof lights and other windows, and yard sweeping are possible instances.

The charges under this account will probably be small, but the separation will be useful for the sake of keeping other accounts clear.

S 2-2, Mechanical Plant Attendance.

This will include more particularly such expenses as oiling shafting and cleaning machinery.

It will be a refinement to debit to this account the usual 10 to 15 minutes spent at the end of each week by each machinist in cleaning down his machine. The job in hand usually has to bear this, but this need not occur if a cleaning allowance is made to each man.

S 2-3, Electrical Plant Attendance.

This will cover the electrician's time round about the Works giving attention to matters that are more in the nature of oiling and cleaning than repairs.

S 2-4, Belting Attendance.

This account will include all belting expenses, except the initial one, when a machine is installed, which may be charged either to Works Additions—Machines (N 2-9) or Works Additions—Loose Plant (N 3-1)—see notes against the former order.

Wages charges in connection with belting will be included as well as materials.

S 2-5, Tool Dressing and Sharpening.

This will include toolsmith's wages dressing tools, and all expenses of sharpening.

The first sharpening of new tools will obviously go in with the cost of making.

This account is very useful when tool sharpening is undertaken by the Shop Tool Stores.

Works General Expenses—Representative Standing Orders, contd.

Works General Expenses.

S 2-6, Plant Removals and Alterations.

This account includes the cost of what are termed improvements but which do not justify any increase in capital values.

The costs will be derived by transfers from the Plant Sub-Order Cost Summary (5-137).

Separate sub-accounts are necessary for each department affected.

Alterations to meet Factory Inspector's requirements may be charged here.

S 3-1, Rent, Rates, Taxes, Fire Insurance and Prevention.

The scope of this account will be fairly obvious.

In regard to Fire Prevention, there may be Fire Brigade expenses to be met.

S 3-2, Works Management and Administration.

This will include the salaries of such staff as Works Manager, and the staff working immediately under him for ratefixing, progressing and the like, together with the Works Accounts Office staff.

General Stores and Warehouse staff will be included under Standing Order S 4-1, and Work Depot staff under S 6-1.

Works correspondence expenses and telephone fees are chargeable here.

Stocktaking expenses should be included here, though probably collected under a special order.

S 3-3, Drawing Office General Charges.

This will include staff time and expenses that cannot conveniently be allocated to specific Sales or Stock Manufacturing Orders.

In the case of tool designing when done in the Works Office or other place away from the Drawing Office, any time not allocated to orders may be included here, or alternatively to S 3-2.

In the matter of Drawing Office work on preparing estimates, catalogues, and the like, if of appreciable amount, such expenditure may be charged to Commercial Expenses (U 1-1).

All photo-printing expenses and all Drawing Office materials will be included here.

Economy will probably result in many cases if Drawing Office materials are properly stored and issued in suitable regular quantities.

S 3-4, Works Stationery.

This account is intended to cover all stationery, books and printed forms pertaining to the Works Administration apart from Drawing Office materials.

Proper storage arrangements are strongly recommended.

S 3-5, Sundry Minor Expenses.

This is a miscellaneous account which can hardly be avoided.

It will include such items as the wages of Gatekeeper, Watchmen (ordinary and latrine), and Messengers, holiday and camp allowances to apprentices and others,* apprentice instruction expenses, and Mess-Room expenses.

In regard to the last named, if the Company run the Mess-Room and handle the takings, special accounts will be necessary.

S 4-1, General Stores and Warehouse Expenses.

The separation of the Warehouse from the General Stores is not always convenient, though generally desirable—the General Stores receiving all materials bought and the Warehouse despatching all goods sold.

Sub-accounts should be kept for each when the distinction is clearly made. Packing materials, such as brown paper, wood, wool, etc., would be chargeable here as Warehouse expenses.

A further sub-account may be necessary in respect to the cost of maintaining unsold product in a saleable condition. See remarks under Standing Order U 1-1.

S 4-2, Sundry Carriage and Package Expenses.

This should not be other than a small accounts as every effort should be made to allocate expenses of this character to the purchases or sales concerned.

There will be a debit at the end of the year in respect to losses on packages. See Standing Order U 3-1.

* Some employers make an allowance to Territorials in their service according to the time spent in camp. The allowance is usually much less than their regular wages. The War Office Authorities make some allowance to the men.

Works General Expenses.

Works General Expenses—Representative Standing Orders, contd.

S 4-3, Material Testing and Treatment.

This account is particularly susceptible to local conditions as to the items to be included and various sub-accounts will often be found necessary.

Material Testing expenses of a general character, and not therefore chargeable to any special order, may arise from tests carried out to guide design or purchasing.

Laboratory general expenses, where such a department exists, would be included here, probably as a sub-account.

The term Material Treatment is intended to cover the costs of such processes that cannot satisfactorily be allocated in any other direction.

Pickling, Sandblasting, Heat Treatment, Annealing, Casehardening, Cutting off Bars in Stores may be cases in point. Separate sub-accounts under each heading would be desirable.

S 4-4, Timber Preparation and Storage.

This is in the nature of Material Treatment, but when it occurs at all, is usually important enough to require a separate account.

In any case special treatment is necessary as regards the distribution of these expenses.

S 4-5, Interdepartmental Transportation.

This has reference to the cost of handling work between departments. It may be a heavy account under some conditions and include carting by horses or mechanical means.

S 5-1, Accident Compensation.

This will be mainly a matter of the Employers' Liability insurance premium payments, though there will be ambulance expenses to be included.

Time lost in consequence of an accident will be charged here.

S 5-2, National Insurance Expenses.

This is a works expense consisting of a compulsory contribution to the State per person employed. The contributions have reference to health insurance and in certain trades to unemployment insurance. A certain rebate is allowed in the latter connection in respect to men employed for 45 weeks in the year by the same employer, and should be credited here.

S 6-1, Shop Stores Expenses.

This will include Pattern Stores, Works Drawing Stores, Tool Stores and Work Depot.

The Pattern Stores expenses are not uncommonly treated as chargeable to the Pattern Shop and possibly included in the General Labouring of that department.

The most satisfactory way seems to be to consider the expense as a general one and mainly chargeable to the departments using castings, if any precise apportionment is attempted in calculating Shop Charges.

So far as is feasible separate sub-accounts should be kept for each department.

S 6-2, Shop Supplies (General).

This account includes the materials requisite for shop use which do not enter into the product. They are sometimes called "non-productive" or "indirect" materials. A better title is that of "secondary" material. Certain of such supplies are charged to appropriate expense accounts, *e.g.* to Power Generation Expenses (S 1-1). See also Process Accounts, Standing Orders G 2-2, H 2-2, K 2-2. The present account provides for supplies of general shop use. Separate sub-accounts will be necessary for each department.

Shop Supplies are sometimes charged to a specific sales order for commercial reasons, as, for instance, in connection with customer's repair orders. Provision may therefore be made on the Cost Allocation sheets for separating out such charges from those for ordinary materials. Some definite routine will require to be established by which the foreman in drawing out Shop Supplies shall indicate when a special order is chargeable.

From a Works Accounting point of view, the fewer charges to special orders the less clerical work and the more consistency there will be in the period totals of this account.

Works General Expenses—Representative Standing Orders, contd.

Works General Expenses.

S 6-3, Overtime Charges.

This account will cover any unallocated overtime charges, such as when overtime results from a general congestion of work in the Shops.

In any case this account will be restricted to overtime allowances on direct production labour.

The overtime allowances on " expense " labour will be allocated with the labour itself.

Departmental sub-accounts will be necessary.

S 6-4, General Labouring.

This has reference to such labour in the Shops that cannot satisfactorily be allocated direct to orders.

The principal items will be that of moving work about the shops by hand or by mechanical means.

The individual help necessary for machines on particular classes of work, such as heavy machine work or erecting, may be charged direct to the order concerned or to this account as local considerations may determine. Any direct charges of this character should figure under Secondary Labour in the Cost Allocation accounts, so as not to be confused with the strictly direct Machine and Hand Labour.

There will be other miscellaneous items such as sweeping shop floors.

Standing time of workmen resulting from temporary breakdown of plant can be included here rather than open a separate account for such occasional expenses.

Another case is that of unallocated wages in connection with groups of machines under single operators. If the operator's wages be assumed as always spread over two, three or four machines there may be occasions when one or other machine is idle. To attempt to adjust the divided wages rate adopted for costing purposes to meet such events means holding up the cost allocation until the end of the week, and does not give any improved accuracy in the allocation. The alternative of a regular divided rate may mean a small balance of unallocated wages to be charged to this account.

Departmental sub-accounts are necessary. In the case of departments subject to process accounts, these expenses will be charged to the respective sub-sections of those accounts (Standing Orders G 2-4, H 2-4, K 2-4).

S 6-5, Shop Supervision and Inspection.

This account will cover supervision that is obviously of a general character, as in the case of a head foreman.

In the matter of foremen not wholly engaged on supervision, only a proportion of their wages will be charged here.

The more ordinary conditions that require consideration are those where the assistant foreman, or chargehand, is engaged in helping the different workers—distributing the work and seeing that each man is properly started on the different jobs. This might almost figure as an operation, so intimately is it bound up with the individual jobs. While, therefore, there is no objection in principle to charging the particular orders with the time consumed in this way, still the difficulty of so doing is almost as much as there would be with the cost of moving work about the shops.

When it is preferred that this time should be allocated to orders instead of being treated as an expense under this account, the basis of allocation should be derived from the wages allocation of the men in the department rather than on some fictitious time sheet made up by a chargehand to pacify the Works Accounts Office.

In the matter of inspection expenses to be included in this account, the conditions are closely parallel to those pertaining to supervision.

If the inspection in question is inspection between operations or groups of operations— alternatively known as viewing or examining—the difficulty of correct allocation may be greater than when only the final examination of finished articles is in question.

The quantities of work and the nature of the operations will affect the considerations so much as to make useless any attempt at defining a method of time allocation suitable for every case.

An approximate allocation by the Works Accounts Office on the basis of the departmental wages allocation may be quite satisfactory in many cases.

Sometimes each viewer can be called upon to make out a daily list of work passed, and allocation might be based directly on this list.

Departmental sub-accounts are requisite here.

Works Sundry Accounts.

There are certain classes of expenditure, not yet dealt with, for which it will be convenient to provide Standing Orders. These may advantageously be grouped together as Works Sundry Accounts, and possibly distinguished by the letter U.

Works Sundry Accounts—Representative Standing Orders.

U 1-1, Expenditure Chargeable to Commercial Expenses.

This will serve to collect the minor expenditure made by the Works from time to time on behalf of the Commercial Branch.

A typical item will be demonstrations in the Works for publicity purposes.

Special orders are desirable for exhibitions and competitions, but the costs may be transferred here if desired.

Drawing Office work in connection with estimates and catalogues may possibly be charged here.

This account may also include the expenses of putting into saleable condition goods returned by customer. It is assumed that the Works will be debited through the financial books with these returns at the same stock price as if new. The cost of restoration, therefore, pertains to the commercial expenses incidental to selling.

The cost of maintaining unsold finished goods in saleable condition can be interpreted possibly as a commercial expense though the reason for not selling may not always be laid to the charge of the selling department. It may be due to late delivery, high cost, bad design or bad workmanship. In such event the costs may be better allocated to Warehouse Expenses (S 4-1).

No shop charges on items in this account can be accepted in the financial books.

The materials, disbursements and wages costs, as reported in the Works Cost Allocation Abstracts, will be duly debited to *Commercial Expenses* in the financial accounts, thus, in effect, relieving or crediting the Works accordingly.

U 1-2, Repairs to Office Equipment (General).

This account might have been included as a sub-account under the previous heading (U 1-1) except that its connection with capital values makes prominence desirable.

The corresponding Additions Account is N 3-3, which is included for convenience in the Works series.

It is supposed that only expenditure in the Works on account of repairs will be included here.

In the case, for instance, of repairs to a typewriter made by an outside firm, there is no necessity for the invoice to come through the Works accounts—presuming the said typewriter does not belong to the Works. On the other hand, no confusion need arise if such an invoice should be passed through the Works accounts—the item would be duly allocated here, and the Works expenditure totals accordingly credited as a consequence.

U 2-1, Scrap Stock Values.

This account will serve for aggregating the debits that are necessary in the cost allocation accounts to balance the credits allowed for scrap returned from the shops.

The debits in question represent the value that the scrap is considered to be worth or will realise when sold—in that way it becomes possible to view this account as the cost account of the scrap produced in the shops.

Although the scrap in question will presumably have been put into stock, the stock accounts can only be debited through the medium of the Works Expenditure Account.

Entry is therefore made in the Works Expenditure Book, on a suitable sheet, of all such scrap items under two headings, as to the scrap that has been credited to orders and the scrap that has not been so credited.

The respective totals for each account period are duly reported to the Financial Department on the Works Product Abstracts. From this abstract the *Works Materials Suspense Account* in the financial books is debited. This transaction may be said to confirm the entries made in the Works Expenditure Book as to their application to the stock accounts concerned.

In debiting the *Works Materials Suspense Account*, the financial accounts are balanced by crediting the *Sales Orders Accounts* or *Stock Manufacturing Account* on the one hand, as to scrap credited to orders, and the *Scrap Account*, on the other, as to scrap not credited to orders.

This *Scrap Account* constitutes an apparent profit, although really representing an over-allocation of material costs against orders.

The amount under the *Scrap Account* is duly transferred to the *Works Profit and Loss Account*, which has the same ultimate effect as if the order costs had been adjusted.

Works Sundry Accounts—Representative Standing Orders, contd.

Works Sundry Accounts.

U 3-1, Returnable Packages Suspense Account.

This account will be debited with the fortnightly totals of returnable packages invoiced, and will be credited with the packages returned. The necessary totals will be derived from the Works Expenditure Book.

A package is to be understood as meaning packing case, crate, barrel, can, bag, wrapping or other medium used to hold or protect goods in transit.

This is strictly a Works Suspense Account, and any balance at the end of the year, not represented by packages in stock, will be transferred to Sundry Carriage and Package Charges (S 4-2). Special attention should be given to returning before stocktaking all packages that it is intended to return.

If the practice previously advocated of dealing with suppliers' packages is adopted, there should be no danger in leaving the survey of stock and necessary adjustment of package losses until the end of the year. Failing that, a round up several times a year will be necessary.

The practice in question is particularly satisfactory when suppliers' packages are occasionally used for despatching sold goods, because the item is automatically marked off on the respective supplier's package account.

Whether the cost of packages so used should be credited to the suspense account under consideration, and debited to the particular Sales Order for which used, must depend on circumstances.

A striving after too great an accuracy in that direction is likely to give far more trouble than the results will be worth.

The essential point is to invoice the package used to the customer, if that is the Company's practice.

For the rest, so long as the packages themselves are efficiently looked after, the Works Accounts need not be burdened with the record of their coming and going.

Further, this arrangement will obviate the Works being debited through the financial accounts with every package returned by customers.

If the package returned was one for which the cost of making had been charged to a specific Sales Order, then the Works will be a little to the good by having the package returned without incurring a corresponding debit.

In other cases, the Works will be the losers by reason of packages not being returned that have never been charged to the Sales Order in question.

To complete the consideration of package problems here, reference is necessary to packages that are made for continuous service, such as between the Works and outside foundries. In these cases the original cost should be allocated to Works Additions—Loose Plant (N 3-1).

Any used package, that is not returnable to a supplier, may be considered at stocktaking as loose plant.

Reserve stock of new packages would figure as general stock.

This will remedy any mix up between supplier's packages and Sales packages, or packages used for the despatch of goods.

Considered as a strict system of accounting, these proposals would be unpardonable, but, when coupled with a system of control, the compromise will be found expedient in many businesses.

As a matter of efficiency, the method of control is more important than the method of accounting. The absence of complete entries in the Works Accounts of the peregrinations of packages is not intended to serve as an excuse for needlessly losing the value of even one package.

U 3-2, Expenditure Suspense Account.

This account is provided to deal with expense payments that cover a longer period than the fortnightly Works Account Abstracts do.

Take the case of insurance premiums (fire and employers' liability) which are paid in advance for the whole year, or only subject to adjustment at the end of the year. To debit the whole amount paid in one fortnight's expense accounts is to throw the figures for the succeeding periods all out of balance.

The disturbing effect will vary under different sets of conditions, but it is not much good surveying expenses at short periods if there is no consistent basis for the expense figures.

The argument could apply to such matters as printed forms and books, or, again, to the expenses pertaining to handling and stacking stock goods when bought in quantities to last a considerable time.

Local circumstances must determine how far it is advisable to use this suspense account.

The method of use is to allocate the expenditure charges as they come through and transfer fortnightly the amounts under each heading chargeable to the current fortnight's expenses. For some items the transfers may for a time anticipate the expenditure charges.

Instances in the latter category are rent, rates and charges for outside power.

Monthly salaries may be possibly considered in this connection when fortnightly account periods are in use.

Works Sundry Accounts.

Works Sundry Accounts—Representative Standing Orders, contd.

All expenditure included in this account must be fully dealt with in the Cost Ledger by transfers to other accounts by the end of the year, so that the balance on the account represents items either not invoiced or invoiced in advance. These items will be reported in the Works Accounts Annual Abstract, for adjustment accordingly in the financial accounts.

It will be very necessary to have sub-accounts for each class of expenditure dealt with through this suspense account.

A memorandum account will be desirable in the Shop Charges Book.

U 3-3, Cost Allocation Differences Account.

This account will deal with the adjusting entries necessary to balance differences in the costs allocated as compared with the expenditure to be accounted for.

In the case of materials charged direct and also of disbursements, it may be assumed that no differences will be passed, but even in those divisions there may be items to be carried over from one account period to the next for agreement purposes.

In the case of stock accounts some minor differences will probably have to be condoned between the allocation totals as extracted from the cost allocation accounts and the totals of issues credited to stock according to the Stock Ledger.

The stock accounts may also be adjusted through the medium of this account in respect to actual errors in stock disclosed by the stock scrutiny—in the case of a shortage, debiting this account and crediting the stock account concerned by a suitably authorised Goods Issue Voucher. A surplus on the stock account would be adjusted as if it were a return of material from the shops, or in other words, as a cancelling entry on the issue side of the Stock Ledger.

In the matter of Wages allocation some minor differences are almost inevitable, though a very high standard of bookkeeping accuracy is easily attainable. There will occasionally be errors in the making up of wages to be carried over from one week to the next. Penal deductions from wages that are not balanced by reducing the time allocation can be balanced by crediting this account.

Separate sub-accounts corresponding with the divisions of the cost allocation accounts are necessary.

Any balance there may be on the several sub-accounts each half-year and year end will be transferred to Sundry Minor Expenses (S 3-5).

U 3-4, Shop Charges Written Back.

This account is necessitated by the practice of applying Shop Charges to Works additions and experimental orders, for Works statistical purposes, which have, however, to be written back or cancelled to meet financial account requirements.

The shop charges in question are transferred in the cost allocation accounts to this account, and written back through the Shop Charges Book by the totals being included in the Shop Charges Supplementary Account.

U 3-5, Discarded Plant Stock Values.

This account is provided to meet the case of unsold discarded plant that has necessarily to be credited at a suitable price—usually scrap price—to the Works Additions Account concerned, and requires to be debited to stock.

It is not desirable to deal with such plant material in the same way as ordinary stock, because of the difficulty of recording its consumption.

To obviate this necessity a Discarded Plant Stock Account is opened in the Shop Charges Book, and the necessary adjustments are made there in respect to losses in stock value disclosed at stocktaking. The figures for this stock account will be collected under the Standing Order under discussion.

Should any item of discarded plant be sold later or its use on a specific Plant Order reported, this standing order would be credited accordingly, and the Sales or Plant Order debited, thus reducing the balance to be considered at the year end.

Meaning of Stock.

Stock in the sense used here may be taken as any goods, the costs of which have not been allocated to a specific account in anticipation of their use.

Any goods held within a stores, whether in the form of shop supplies, raw materials, castings, forgings, finished components, or even assembled product, are covered by the term stock to the extent to which the items have been included in their existing form under the heading of stock in the Works Expenditure Account.

At the end of the financial year, work-in-progress or in course of manufacture under specific orders, constitutes an element of stock so far as the *Balance Sheet* is concerned, but work-in-progress does not come within the category of stock as at present under discussion.

It is not an uncommon practice for the term " Stores " to be applied to supplies and raw materials, and, in the sense that one might refer to, say, a ship's stores, the term is correctly applied.

For the present purpose it will be convenient to consider " Stores " to have reference to the place in which stock of any kind is kept, rather than to the stock or any particular portion of the stock contained therein.

Following from this, it is necessary in passing to make clear that the term " Stock " will not have particular reference to finished factory product, as is sometimes the case, but will be all-embracing as to any goods held in stock.

" Goods " is used here instead of the more common term " materials," as allowing a wider interpretation.

Local conditions must regulate the lines to be followed in organising a stores system, but there are a number of principles that will apply in at least the majority of cases.

Special Purchases.

Firstly, it may be assumed that there will always be a certain number of purchases made of goods for particular orders that can hardly be said to pass into stock when received.

When special purchases, that are only useful on special orders, are in question, it is rather dangerous to consider such items as even temporarily in stock, lest the stock accounts be left with surpluses of special material at cost price instead of scrap price.

As, however, the Stores receive the goods in question, there should be some routine established by which the issue of the goods is demonstrated and the allocation confirmed. This may be done by requiring a Goods Issue Voucher to be furnished by the party to whom the goods are issued. 5-86.

These vouchers will be lodged with the Works Accounts Office, and attached there to the respective Goods Received Notes. These 5-82.

Special Purchases.

notes and vouchers can thus be made to serve as individual stock accounts for each consignment. Any surplus material that is not issued must come under review before the records can be cleared.

It may be that these vouchers will be made out by the Stores, and sent as an advice to the department interested, the foreman of which will sign the voucher when requiring to draw the goods. Against this routine may be set the undesirability of the foreman always drawing the whole of a special consignment unless the whole has to be worked upon forthwith. It may be easier for the Stores to be finished with the responsibility at once, but neither this nor accounting convenience should force materials into the shop before the proper time, or in larger quantities than convenient for production.

There is a further point in this connection, namely, that in purchasing special material it will often be important to allow a margin for wastage. This margin ought, in theory, to be held in the Stores pending the necessity for drawing upon it. The accounting method offered will not prevent all these points being met.

Stock Classification.

Having provided for special purchases that are outside the normal operation of the stock accounts, the next and main consideration affecting the stores organisation is the grouping of the stock itself.

The stock as a whole may usually be divided under two headings, viz. General Stock and Component Stock. The divisions will usually comprise the following group :

General Stock.

Raw Material.
Shop Supplies.
Hardware.

Component Stock.

Standard Fittings.
Rough Components.
Components for assembling.
Spare Components.
Complete Product.

Each factory has its peculiar range of stock and its own conditions of storage to meet, but allowing for all that, it will be helpful to consider the lines of classification likely to apply in average cases.

In submitting a classification list of general stock, the underlying idea is to demonstrate a sub-grouping of items likely to be stored in proximity to each other.

It is of primary importance that the classification scheme adopted for stock account purposes should be serviceable also as the basis of an identification system within the Stores.

The classification will require to be developed if every variety and size of article is to be identified by numbers and symbols. The necessity for such development will depend on many factors, not the least important being the capacity of the storekeeper to properly utilise such methods.

Although there may be no present intention of applying the classification scheme to identify the stock by labelling the bins in

Stock Classification.

any particular way, there can be no objection to adopting for the stock accounts a system capable of this application. There is the further point that for stock control purposes in the Stores a purely alphabetical sequence of records is likely to be unsatisfactory.

Alphabetical sequence is quite advantageous when restricted to related classes of goods.

In the classification list of representative items of general stock submitted further on, due regard has been paid to the desirability of alphabetical reference in the respective groups. By this arrangement, anyone familiar with the general scheme of the classification can use the list readily without any cross indexing.

A practice sometimes adopted of numbering the stock accounts to correspond with the bin numbers is likely to involve an index as bulky as the list of accounts.

The classification offered does not deal with Component Stock, as this is necessarily peculiar to each business, except as to Standard Fittings. The part numbers and type symbols adopted for production purposes, and appearing on the drawings, should be the basis of such a classification.

It may be remarked that code words, when suitably arranged in alphabetical groups for each type of catalogued products, can be usefully employed sometimes for identifying warehouse stock.

The main lines of the classification suggested for General Stock are as follows :

Raw Material.	Iron and Steel. Non-Ferrous Metals. Non-Metallic Materials. Timber.
Shop Supplies.	Drysalteries. Fuel and Process Supplies. Oils and Greases. Painting Supplies. Plant Supplies. Utensils and Implements. Stationery, Office and Packing Supplies.
Hardware.	Sundries. Pipe Fittings.

While it is possible to detail a good many typical items falling under each of the above sub-headings, no attempt will be made to apply class numbers, as the numbering scheme will depend on the range of stock items kept.

Any class may include several sizes or varieties of articles bearing the same name, though the class number soon loses its identification if the varieties included are substantially different articles apart from size.

Sub-class references for different varieties or sizes may be formed by the affixing of small letter references, as 3/9*a* for Hose, Rubber Armoured.

One reason for advocating a number reference for stock accounts, in place of a name reference, is to obviate the difficulty arising

Stock Classification.

from the use of different names for the same article. In the classification list as issued in any factory, presumably in the form of a blue-print, local alternative names may be added if thought necessary, to the name adopted for classification purposes.

General Stock—Representative Classification.

Iron and Steel **(I)**	**RAW MATERIALS.** *Bar (I).* Iron, Cast. ,, Common. ,, Lowmoor. Steel, Cast. ,, High Speed. ,, Mild, Black. ,, Mild, Bright. *Ingot (I).* Iron, Pig. Steel, Blooms, Bessemer. ,, ,, Siemens Martin. *Plate (I).* Iron, Galvanised. Steel, Cast. ,, Lagging. ,, Mild. ,, Spring. ,, Tinned. *Scrap (I).* Iron, Cast. Steel & Wrot. Iron, Plate. ,, ,, ,, Swarf. *Sections (I).* Steel, Angle. ,, Channel. ,, Joist. *Tube (I).* Steel, Solid Drawn. Wrot. Iron, Gas. ,, ,, Steam. *Wire (I).* Iron, Black. ,, Galvanised. Steel, Cast Silver. ,, Mild. ,, Piano. ,, Spring. *Wire Rope (I).* Steel, Galvanised. ,, Plain.
Non-Ferrous Metals. **(II)**	*Bar (II).* Brass, Brazing. Copper, Soft Rolled. Gunmetal, Cast. Manganese Bronze, Hard Rolled. Phosphor Bronze, Rolled. *Ingots (II).* Aluminium. Antimony. Copper. Gunmetal. Lead. Manganese Bronze. Phosphor Tin.
Non-Ferrous Metals—contd.	Raw Materials—*contd* Spelter. Tin. White Metal. *Plate (II).* Brass. Copper. Lead. Terne. Tin. Zinc. *Scrap (II).* Aluminium. Brass. Copper. Gunmetal. Manganese Bronze. Phosphor Bronze. White Metal. *Sections (II).* Brass Strip. *Tube (II).* Brass. Copper. *Wire (II).* Brass. Copper. Lead. Phosphor Bronze. *Wire Gauze (II).* Brass. Copper.
Non-Metallic Material	Asbestos, Cord. ,, Millboard. Canvas. Ebonite, Rod. ,, Sheet. Felt. Fibre, Red Vulcanite, Rod. ,, ,, ,, Sheet. Leather. Line, Marline. ,, Sash Cord. ,, Spun Yarn. ,, String. ,, Tarred Flax. Rope, Manilla. ,, Tarred Hemp. ,, White Cotton. Rubber Hose. ,, Sheet.
Timber	Ash. Beech. Birch. Boxwood. Deal, Yellow. ,, White. Ebony. Elm. Larch.

Stock Classification.

General Stock—Representative Classification—contd.

Timber contd.	RAW MATERIALS—*contd.* Lignum Vitae. Mahogany Maple. Oak. Pine, Pitch. ,, Red. ,, Yellow. Spruce. Teak. Walnut. Whitewood.
Drysalteries.	**SHOP SUPPLIES.** Alum. Bath Brick. Black Lead. Borax. Candles. Chalk, French. ,, White Lump. Cleaning Cloths. Corks. Disinfectants. Emery Cloth. ,, Discs. ,, Powder. Glass Paper. Glue. Graphite. Gum Arabic. Hessian. House Flannel. Lamp Wick. Matches. Metal Polish. Methylated Spirits. Potash. Pumice Stone. Resin. Salammoniac. Salt. Saltpetre. Shellac. Soap, Household. ,, Soft. ,, Toilet. Soda. Solder. Soldering Paste. Sulphur, Flour. Wax. Welding Composition. Whiting. Wipers.
Fuel and Process Supplies.	Acid, Nitric. ,, Sulphuric. Casehardening Composition. Charcoal. Coal, Household. ,, Smithy. ,, Steam. Coke, Foundry. ,, Gas. Firewood. Foundry Loam. Foundry Sand. Ganister. Hazel Rods. Limestone. Petrol. Straw Rope.
Oils and Greases.	Cutting Compound. Grease, Anti-Corrosive. Oil, Castor. ,, Cleaning. ,, Colza.
Oils and Greases—contd.	SHOP SUPPLIES—*contd.* Oil Cylinder. ,, Linseed, Boiled. ,, Linseed, Raw. ,, Lard. ,, Olive. ,, Paraffin. ,, Rangoon. ,, Rape. ,, Sperm. ,, Shafting. Tallow.
Painting Supplies.	Colours, Dry, Miscellaneous. ,, ,, Red Lead. Colours-in-oil, Miscellaneous. ,, ,, White Lead. Colours-in-turps, Miscellaneous. Dryers. Paint Remover. Turpentine. Varnish, Anti-Corrosive. ,, Copal. ,, Japan Gold Size. ,, White Hard Spirit.
Plant Supplies.	*Building Repairs.* Bricks, Fire. ,, Ordinary. Cement. Corrugated Iron Sheet. Fire Clay. Glass, Sheet. Lime. Pipes and Guttering, Earthenware. Pipes and Guttering, Iron, Cast. Pipes and Guttering, Iron, Galvanised Sheet. Pipes and Guttering, Lead. Pitch. Putty. Roofing Felt. Sand. Size, Concentrated. Slates. Tar. *Electrical Repairs.* Arc Lamps, Carbons. ,, ,, Spare Parts. Cells, Le Clanché. Cutouts. Fusible Plugs. Incandescent Lamps. ,, ,, Fittings. Insulating Tape. Mica. Terminals. Wire, Electrical. *Millwright Repairs.* Belting, Flat Tanned, Single. ,, ,, Double. ,, Rawhide. ,, Round Leather. Belt Dressing. ,, Fasteners. ,, Laces. Gas Burners. ,, Fittings. ,, Globes. ,, Mantles. Gauge Glasses. Packing, Engine. Plant, Spare Parts.

Stock Classification.

General Stock—Representative Classification—contd.

SHOP SUPPLIES—*contd.*

Utensils and Implements.

Bellows.
Bottles, Glass.
Brooms, Bars.
,, Hair.
Broom Handles.
Brushes, Banister.
,, Circular.
,, Duster.
,, Paint.
,, Sash Tool.
Scrubbing.
,, Stencil.
,, Tar.
,, Water.
,, Wire.
Cans, Drip.
,, Oil.
,, Water.
Chisels.
Crucibles.
Drills.
Emery Wheels.
Files, Flat Hand.
,, Half Round.
,, Round.
,, Square
,, Three Square.
,, Warding.
File Cards.
File Handles.
Forks, Coke.
Gloves, Stokers'.
Goggles.
Hammers, Hand.
,, Lead.
,, Sledge.
Hammer Handles.
Knives, Shoemakers'.
Ladles.
Lamps, Tin Hand.
Mallets, Boxwood.
,, Hide.
,, Hide Refills.
Mats.
Mops, Household.
Oil Feeders.
Pails.
Paint Kettles.
,, Strainers.
Pliers.
Polishing Bobs.
,, Mops.
Punches, Leather.
Sacks, Coal.
Saws, Band.
,, Circular.
,, Hack.
Screw Drivers.
Shovels.
Soldering Irons.
Sieves.
Spanners, Adjustable.
,, Double Ended.
Squeegees.
Syringes.
Taps.
Vice Clamps, Copper.
,, ,, Lead.

Stationery, Office and Packing Supplies.

Adhesives.
Blotting Paper.
Carbon Paper.
Cards, Guide.
,, Record.
Envelopes.
Erasers.
Ink.
Labels, plain.
Memorandum Books and Pads.
Paper, Drawing.

SHOP SUPPLIES—*contd.*

Stationery, Office and Packing Supplies—contd.

Paper, Photo Printing.
,, Tracing.
,, Typing.
,, Writing.
Paper Fasteners.
Pay Boxes.
Pen Holders.
Pen Nibs.
Pencils.
Rubber Bands and Sorters.
Sanitary Paper, Loose.
,, ,, Rolls.
Strawboard, Corrugated.
Towels, Hand.
,, Roller.
Wrapping Paper, Brown.
,, ,, Oiled.

HARDWARE.

Sundries

Brackets, Japanned Wrot. Iron.
Chain, Brass, Chandelier.
,, Steel, Black Japanned.
,, Steel, Solid Twisted Curb Link.
Coach Screws.
Dowels, Brass Screw Plugs.
,, Brass Screw Sockets.
,, Malleable Iron.
Drawer Pulls, Brass.
Drawer Pulls, Brass, Combined Pull and Card Holders.
Drawer Pulls, Iron, Japanned.
Hinges, Butt, Brass.
,, Butt, Iron.
,, Strap, Iron.
Hooks, Hat and Coat, Jap'd.
Hooks and Eyes, Cabin, Brass.
Knobs, Japanned.
Letters and Figures, White Metal.
Locks, Brass, Till and Cupboard.
,, Iron, Till and Cupboard.
,, Iron, Padlock.
Nails, Brass Panel Pins.
,, Copper Nails.
,, Steel Brads.
,, Steel Cut Nails.
,, Steel Tacks.
,, Steel Wire Nails.
,, Steel Wire Points.
Rapping Plates.
Rivets, Copper.
,, Iron, Charcoal.
,, Iron, Common.
,, Iron, Lowmoor.
Screw Eyes.
Screw Hooks.
Staples, Galvanised.
Wood Screws, Brass, Csk. Hd.
,, ,, Brass, Rd. Hd.
,, ,, Iron, Csk. Hd.
,, ,, Iron, Rd. Hd.
Wood Screw Cups.

Pipe Fittings.

Wrot. Iron Connections, Back Nuts.
,, ,, ,, Bends.
,, ,, ,, Crosses.
,, ,, ,, Elbows.
,, ,, ,, Flanges.
,, ,, ,, Nipples.
,, ,, ,, Plugs.
,, ,, ,, Sockets.
,, ,, ,, Tees.

Stock Classification.

Component Stock—Partial Classification.

STANDARD FITTINGS.

Balls, Steel.
Bolts, Steel, Bright.
Bolts and Nuts, Black Faced.
,, ,, Galvanised.
Cocks, Gland.
,, Pet.
,, Plug.
,, Stop.
Cotter Pins, Brass, Split.
,, ,, Steel, Split.
,, ,, Steel, Taper.
Keys, Parallel.
,, Taper.
Lubricators, Grease Cups, Screw Down.
,, Needle.
,, Oil Cups, Sliding Lid.
Name Plates, Cast.
,, ,, Etched.
Nuts, Brass Hexagon.
,, Steel Hexagon, Black.

STANDARD FITTINGS—*contd.*

Nuts, Steel Hexagon, Bright.
,, Steel Hexagon, Castellated.
,, Steel Hexagon, Lock.
,, Steel Hexagon, Turret.
Screws and Set Pins, Brass.
,, ,, ,, Iron.
Studs, Steel.
Taps, Bib.
,, Stop.
Unions, Plumbers'.
Valves, Check.
,, Globe.
Washers, Brass.
,, Copper Asbestos.
,, Felt.
,, Iron, Black.
,, Leather.
,, Spring.
,, Steel, Bright.

Function of Stock Accounts.

The function of the stock accounts is affected by their relation to the stores organisation generally.

The best way of looking at stock accounts is to consider them as existing virtually for account checking purposes, as distinct from stock control purposes.

On the one hand they serve to give the balance of stock to be accounted for by the Stores, and on the other to prove that the totals credited to the respective stock accounts agree in grand total with those of the material cost allocation accounts.

These considerations make the stock accounts essentially accounts of money values.

As the quantities of materials received and issued are necessarily recorded to provide intelligible stock accounts, it is not unusual for stock control to be attempted through the stock accounts.

The objections to combining these functions in the one system of records are threefold.

Stock Control records require to be in the hands of the man controlling the stock.

As argued alsewhere, this may mean that the control records as to component stock should be centred in the Works Office. (See Stock Appropriation Routine, p. 443.)

So far as the Storekeeper controls the stock he will need the requisite records ready to his hands all the time, so that it is hardly feasible that money values should be entered in the same set of records, without at least taking the whole of the stock account work away from the Works Accounts Office.

For efficient stock control the records of receipts and issues should be kept posted close up to time all day and every day.

This condition alone rules out money values on these records because invoices may not be to hand before the goods are issued, and, if they are, the pricing out of the issues means delay, which must be avoided. It would be possible, no doubt, to do the pricing and make the extensions afterwards, but this would not eliminate the objections mentioned above.

The subdivision of records necessary for stock control purposes means practically a separate record for each size and each variety of each kind of article kept in stock.

This itemised division would be too cumbersome if money values were in question, not because of any difficulty in making the necessary entries, but because of the multitude of totals to be collected each account period if agreement between the Stock accounts and cost allocation accounts is to be proved.

Accuracy in Stock Accounts.

The primary conditions requisite for accuracy in the stock accounts are twofold.

Correct identification of the goods received.
Correct identification of the goods issued.

There are, in addition, related questions of accuracy in pricing the stock issues, and accuracy in the cost allocation of same.

To obtain this correct definition or identification with ease and certainty means having a common basis of reference by both the Stores and the Works Accounts Office.

The practice of identifying consignments of all goods received by labelling with the Goods Received No. (G.R. No.), provides in itself a perfect system of identification, providing the different consignments can be kept distinct while in the Stores. Obviously this scheme implies the quoting of the G.R. No. on the respective Goods Issue Vouchers. Such a routine has already been advocated in the case of special purchases of goods that do not pass through the stock accounts proper.

Much as the scheme of continuously identifying each consignment of goods is to be commended in principle, there will be too many difficulties in the way for it to be applied to all classes of stock.

For these reasons more general arrangements for identification are necessary, and these have been indicated in the classification offered of typical items of general stock.

When formulating a suitable system of stock accounts to suit a given works, arrangements are necessary to ensure the proper carrying out of that system.

This checking of the stock accounts or stock scrutiny, as it may be better called, can be carried out so thoroughly as to cost too much. On the other hand, stock accounts cannot be relied on that are not subject to some regular scrutiny.

Stock auditing is a term sometimes used in this connection, but it is inadvisable to use the term auditing in other than its orthodox financial sense. Stock scrutiny, in the sense used here, is more than a check of book-keeping accuracy.

Stocktaking once a year is the usual check on stock accounts, but only incidentally then, because actual counting and weighing of stock is necessary, under average conditions, to provide the Management with the data for issuing a certificate of the true total values of stock.

The annual stocktaking may be claimed as stock scrutiny on the grand scale, in fact, on too large a scale for all the differences disclosed, between the stock as taken and the stock according to the stock accounts, to be investigated.

Accuracy in Stock Accounts.

Flagrant errors will be noted and adjusted, but, generally speaking, the annual stocktaking is an altogether unsatisfactory substitute for proper scrutiny the year through.

The best compromise in this matter is to establish the practice of a clerk from the Works Accounts Office making a visit of inspection, possibly at stated times, say twice a week.

The programme for each visit should be drawn up by the Works Accountant, but no notice of the programme should be given to the Storekeeper.

An elaborate programme is not necessary, as the necessary disciplinary effect can be achieved by dealing with a few items, while the interference with the Stores routine is proportionately less.

Shortages, both actual losses by dishonesty and apparent losses by reason of failure to obtain proper vouchers before issuing, will be found to occur mostly with articles of general utility, such as soaps, candles, brushes, etc.

Proved inaccuracies in stock balances must be strictly dealt with, not so much for the particular values that may be in question, but because, for every inaccuracy proved, there are certain to be others that are unproved. A stock balance in excess of the stock account balance implies inaccuracy as much as a shortage does, and carelessness should not be condoned because there seems to be no question of missing stock. Discretion will be necessary as to what differences are permissible in the case of goods issued in small quantities from bulk, such as bars.

Stock scrutiny involves testing the actual stock balance against the stock account balance and may be extended to include a criticism of the rate of consumption, especially shop supplies.

This extended sphere, if attempted, must first be mutually agreed upon between the Works Manager and the Works Accountant.

The work of stock scrutiny may be facilitated by first testing the actual stock against the stock control records, and then as a separate 5-89. stage to test the stock accounts against the stock control records after expressing the balance shown on the latter in terms of value. This point is dealt with again in connection with the agreement of the Stock Ledgers. 5-123. 5-126.

Sub-Stores.

The question of the oversight of the respective sub-stores largely settles the stock accounting routine necessary.

If the Head Storekeeper is qualified and in a position to supervise the sub-stores, it will be possible to ignore the sub-stores in the stock accounts, and to keep only single accounts, as if the stock were all located in the General Stores.

The advantage of this course lies in eliminating from the stock

Sub-Stores. accounts all entries of the transfers between the General Store and the sub-stores.

In the case of a sub-store under a departmental foreman, separate stock accounts will be necessary for the various articles held.

The accounting requirements necessary when transferring goods from the General Stores to a departmental stores having separate stock accounts, can be very well met by the use of a Goods Issue Voucher suitably endorsed. These transfers will be dealt with in the stock accounts by a credit entry (in red ink) in the " receipts " column of the one account and a corresponding debit entry under " receipts " in the account benefitting by the transfer of stock.

Recommendation is made elsewhere as to utilising the Tool Stores as a sub-stores for distributing shop supplies. When this plan is adopted, it will be more convenient to allocate the transfers, as they are made, to the departmental shop supplies account—apportioning by estimate, if need be, when more than one department is served. No serious error in cost allocation need arise by this practice and much clerical labour will be saved. As already pointed out, substantial economies in the consumption of supplies are likely to arise from this course, amply justifying the approximations made as to allocation. Shop supplies may possibly be drawn from the Tool
5-91. Stores by means of Tool Loan Slips. When, say, a Sales Repair Order is to be charged with supplies of this character, the Tool Loan Slips can be marked accordingly and passed to the Works Accounts Office, who will credit the expense account and debit the repairs account.

Fuel stock should be the subject of a departmental stock account, and its consumption reported by the person responsible for the power efficiency generally. Stock scrutiny will have to be by rough estimate of stocks, but should not be neglected on that account. On the other hand, by making up each stack of a known quantity and working it right out when once commenced, the call for estimating will be small, as there should be only one broken stack of each kind of fuel.

The conditions to be met in regard to the stock accounting of process supplies, in connection with the Foundry and Smithy, are discussed under the heading of Process Product.

Timber. In the matter of Timber Stock which requires special treatment in the accounts, some aspects are discussed under materials. It may be added here that, under ordinary circumstances, it will not be worth while to attempt to subdivide the timber stock accounts by scantlings unless the timber is likely to be used in the form in which it is purchased.

Timber. 5-88.

The issues of timber will be derived from Timber Tickets, as previously mentioned.

Assuming single accounts for all scantlings of each kind of timber, the first stage in the stock scrutiny will be to take the stock account balance and test its accuracy by abstracting the total balances, in terms of quantity, from the Stock Control Cards for each scantling and pricing same out. The balance in the timber store and the balance in the shop in process of conversion, or to be otherwise accounted for, will of course, have to be added together.

The difference between the total values of stock shown by the stock accounts and the stock shown by the Stock Control Cards, will represent the combined errors of incorrect pricing and incorrect reporting of quantities used. Considerable judgment will be necessary to determine where the error lies in some cases.

The prices used should be sufficient to cover the loss of material by conversion and the normal wastage in working the timber. In regard to other expenses, such as the wages cost of conversion, or the expenses of drying and storage, to allow for these in the pricing will prevent the stock accounts being agreed as to book-keeping accuracy. It would also introduce certain inaccuracies in the works accounts by allocating as " materials " items of expenditure not included under that heading in the Works Expenditure Account.

There are two alternatives with reference to distributing these expenses, the one is to apply them as a material service charge on the basis of the quantity of timber issued, and the other is to throw them into the general expenses of the wood-working department to be distributed in the form of shop charges. These shop charges would be applied on the basis of the labour expended in working up the timber into a finished product.

While the material service charge will be the more nearly accurate method, the inclusion in the shop charges will be an acceptable method in many cases as being less troublesome and not seriously inequitable.

In some businesses the timber stock is valued at an increased rate for each year that it has been kept in stock for seasoning purposes.

In the annual inventory this discrimination causes no inconvenience, but to recognise these fine gradations of prices according to age in the stock accounts means complications in pricing the timber used.

A serviceable compromise will be to price all seasoned timber of the same grade, whatever its age, at a common rate, and to assume that no unseasoned timber will be used. This will allow a different valuation for seasoned timber as against unseasoned or only partly seasoned timber, in the annual inventory, without seriously confusing

Timber. the stock accounts. Any difference disclosed between the two sets of figures will be adjusted by charging the Timber Preparation and Storage Account. See Standing Order S 4-4.

Touching the conversion of timber into wheel spokes or felloes, for instance, which are kept in stock a year or two for seasoning after being roughly cut to shape, the work of conversion should be dealt with under a Stock Manufacturing Order and the product (the rough blocks) duly charged into stock as materials. These blocks would then be dealt with under separate stock accounts and priced at so much each, inclusive of all expenses up to that stage.

Painting Supplies. Some difficulties arise in dealing with the stock account of painting supplies owing to the mixing necessary for obtaining various colours and qualities, and the impossibility of returning the unused mixed paint into stock in the form in which the various constituents were originally issued from stock.

The difficulties are most troublesome when small values are at stake, and, therefore, a compromise is especially worth considering.

One such compromise is to fix a schedule of prices per pound, exclusive of labour, for the various kinds of mixed paints, and then to have the leading painter, or foreman if there is one, report each day to the Works Accounts Office the quantity of paint used of each grade.

This report will be used for allocating the cost of paint to the individual orders, and the grand total credited to stock account for mixed paints.

The constituent materials will be drawn from the General Stores as required, and the values transferred from the respective stock accounts to the mixed paints stock account.

It is suggested that the labour of mixing paints be allocated either to the particular job as part of the wages cost of painting, or, when that is not possible, to the General Labouring Account for the department.

The stock checking or scrutiny possible in the case of painting materials in the Paint Shop is limited, and for that reason it is better, if possible, to hold the bulk of the stock in the General Stores, unless circumstances justify a properly supervised Paint Stores, as, for example, in a shipyard.

The mixed paint stock account can be watched to an extent through the fluctuations of the balance unaccounted for, though a fairly frequent survey of the stock in the Paint Shop will be necessary to ensure sufficient attention being given to the daily reports.

Demonstrated shortages in the shop stock should be allocated to the Departmental Shop Supplies Account.

Returns from Shops.

Coming to the subject of Returns from the Shops, so far as the stock accounts are concerned, materials returned in the same form as originally issued get back into stock—from the accounting point of view—by the simple process of reducing the sum totals of issues, and this is a distinctly better method than treating such returns as additional receipts. This course avoids interfering with the agreement of stock purchase totals in the Works Expenditure Account with the stock account receipt totals, and obviates inflating the totals on the stock control records.

When, however, the material returned is no longer in the same form as it was issued, such as is the case with non-ferrous swarf and defective material—for the latter cannot be passed back into stock with good material—it is necessary to treat the returns as new materials, to be recorded as receipts under suitable scrap stock accounts.

To achieve this result, which is obviously wholly an accountancy requirement, the Shop Credit Slips referring to such returns are 5-87. aggregated in the Works Expenditure Book—after being utilised as 5-119. the basis of credits in the Cost Allocation Accounts to the original orders where specified—and the totals incorporated in the Works Product Abstract each account period. The effect of this transaction is dealt with elsewhere.

Pricing of Purchased Stock.

In connection with goods subject to considerable market fluctuations in price, such as copper and non-ferrous metals generally, the point arises as to whether current market prices or purchase prices shall be used in the cost allocation accounts and consequently in the stock accounts.

There is something to be said for recognising market fluctuations, but the accounting result is very unsatisfactory.

The proper course seems to be to adjust all stock prices yearly, or, at most, half-yearly, so that such prices shall not exceed the market prices current at the time of valuation, but otherwise the prices used will be the net purchase or cost price. A lump sum reservation also can be made against the risk of unfavourable fluctuations in market values between these valuations.

Goods purchased during the course of the year will be allocated at the net purchase price, as nearly as possible. To do this with precision means that each purchase of each sort and size will be used up before the next consignment is touched.

In using any set of cost allocation figures for tendering purposes, prospective market prices of materials must obviously be allowed for in the tender, whatever may appear in the cost accounts to which reference may be made, so that there seems no real advantage in

Pricing of Purchased Stock. attempting the adjustment of stock prices in an endeavour to follow market fluctuations.

Pricing of Doubtful Stock. With regard to doubtful stock, that is, stock of doubtful utility to the particular business concerned, it is much better at the annual stock valuation to make a lump sum reservation or deduction on this account, rather than attempt to write down the individual items. Of course, if stock is positively of reduced value, through deterioration, the right course is to reduce the stock price of such items.

There will be many cases, particularly with component stock, where the prospective utility is in much doubt and yet the stock has not actually deteriorated. It is highly desirable to recognise the risk of the stock never being used, and the lump sum reservation does this without necessitating any adjustment of prices in the stock accounts.

So long as the financial accounts embody the reservation, as to which the Works Manager will be responsible for recommending an adequate sum, it is not necessary to recognise the reservation in the stock accounts.

The result will be that any item in respect to which reservation has been made, will, when used, be charged out at the normal full price, and this is fair because it is evidently worth full value in that instance.

Pricing of Manufactured Stock. In pricing manufactured stock product, the use of inclusive prices, comprising all the elements of the Works cost, is advocated. The method of arriving at these stock prices is discussed elsewhere.

Stock Price Records. The pricing of stock issues is so considerable a factor in the routine of the stock accounts and cost allocation accounts that the method of compiling the price records is of some importance.

These records should be independent of the purchase entries in the
5-86. stock accounts, so as to allow more freedom in dealing with the Goods Issue Vouchers.

These vouchers will need to be priced and extended, as they are received in the Works Accounts Office, with a view to their prompt entry in the cost allocation accounts. This condition will entail continual reference over the whole range of stock prices, so that the handiest form in which to keep these records will be on loose sheets suitably mounted in book form, or possibly on linen-hinged cards
5-124. mounted on a stand. An ordinary card index, while affording the
5-127.
5-128. necessary elasticity of arrangement and renewal, is not the most rapid method in service.

Price records should be made in ink and dated, and, as prices are superseded, they should only be ruled through instead of being obliterated.

Stock Price Records.

Further, the style of the records should be intelligible to anyone, and not be too much in hieroglyphics understandable only by the compiler.

For some classes of goods, such as wood screws, files and pipe fittings, tables will be necessary showing the net prices of each size and variety.

Weights and Measures.

A matter of moment in connection with stock control records and stock accounts is that of weights and measures. Some consideration has been given to the possible reforms of British Weights and Measures by various associations, notably the Decimal Association on the one hand, who stand for the adoption of the metric system, and the British Weights and Measures Association, who aim at simplifying the established system by using fewer of the units rather than attempt the herculean task of adopting new units for all trades and all conditions.

For works purposes all weights might be in pounds, all lengths in inches, all liquid measures in pints, and all numbers in units. The use of inches is the more debatable of the four suggested units.

The importance of these points lies in the multitude of transactions involved. Every figure saved in entering and every effort saved in calculating may mean an appreciable gain in the long run.

From the accounting point of view the difficulty is one of ready reckoner tables suited to the use of smaller units.

Ready Reckoner Tables.

The preparation of special ready reckoner tables is not a very formidable task if one is equipped with suitable lithographed forms, on paper from which photo prints may be taken, and the master calculator tables that are on the market.

There are many net prices, resulting after deduction of trade discounts, that are not provided for in the majority of ready reckoners which cater more for selling and purchasing purposes than for stock or cost accounts.

If special ready reckoner tables are prepared, local requirements can be net to a nicety as to rate and range, and also in terms of the simpler units suggested above.

The use of simpler units obviously extends the application of mechanical means of calculation. In stock accounts the main use of mechanical calculation will lie in abstracting the totals of the receipts and issues each account period for agreement purposes.

Stock Ledger.

The method of keeping the stock accounts must necessarily be in

Stock Ledger. ledger form, the stock in hand and receipts appearing on the one side
5-125. of the account and the issues on the other.

5-123. The term Stock Ledger is applied to the stock accounts as a whole.

5-126. Returns from the shops, as previously stated, are treated as reducing the issues, except in the case of scrap, which constitutes material in a new form and is recorded, therefore, as a receipt.

Returns from customers are also in the nature of fresh receipts, so far as the Works Expenditure Account is concerned, and must be treated accordingly.

The transactions in connection with the keeping of the Stock Ledger may be tabulated as follows :

STOCK LEDGER.

Receipts.	Issues.
Purchases—per Goods Received Notes. **Stock Products** **Returns from Customers** **Scrap Receipts.** per Works Expenditure Book.	**Issues.** per Goods Issue Vouchers. per Departmental Reports. — Foundry. Smithy. Power House. Painter. Builder. Electrician. Millwright. per Timber Tickets. per Tool Loan Slips (for Shop Supplies charged to Orders instead of expenses).
	less **Returns from Shops,** .. per Shop Credit Slips.

Stock Ledger Agreement. It is necessary that the Stock Ledger should be agreed regularly in regard to its bookkeeping accuracy.

The first stage is to verify that the totals entered on the receipts side of the Stock Ledger agree with the total expenditure in respect
5-115. to stock as recorded in the Works Expenditure Book, which in turn is agreed with the financial books.

On the issue side of the Stock Ledger verification is a more involved matter.

Assuming for the moment that all the Goods Issue Vouchers and other vouchers are correctly priced and correctly extended, the entries in the Stock Accounts can be tested in total against the totals of stock issues entered in the cost allocation accounts. Both sets of entries are derived from the same vouchers, and agreement of totals may be accepted as evidence of correct posting and correct totalling in both cases.

In making this test, mechanical means for making the totals will save a great deal of time and minimise the risk of inaccuracy being introduced at this stage.

Stock Ledger Agreement. 5-130.

The cost allocation accounts need to be divided to correspond with the main sections of the Stock Ledger, viz., General Stock and Component Stock.

Small differences may have to be passed, but it must be borne in mind always that a small difference in grand totals may represent a balance of relatively large errors.

With the Stock Ledger entries of receipts and issues verified to the above extent, there remains the question of whether the issue vouchers have been correctly priced and extended.

Obviously, any error in this direction will be reflected in the balances of the various stock accounts. These balances may be considered as the book values of goods to be accounted for by the respective Stores. The object of continuous stock scrutiny, as already discussed, is to verify the existence of this balance of stock, and, in so doing, to confirm that there is no error in the book values.

As it may be assumed that all issue vouchers have been duly noted for stock control record purposes, the balance of stock shown by these records ought to work out in value to agree with the stock account balance. It will constitute a valuable application of stock scrutiny, although limited to records and not based on actual stock checking, if the stock control record balances are frequently priced out in this way. A reasonably near agreement will confirm the general accuracy of the issue vouchers applying to the respective accounts that are tested, and by inference a general accuracy all round in the work of pricing and extending the issue vouchers.

Given these conditions, the stock control record balances can be checked against the actual stock at any convenient time without bringing the stock accounts into line at that moment.

The proving of a high degree of accuracy in the stock accounts, and in the stock control records, will meet all reasonable requirements of works accounting, without the actual auditing of every entry as necessary in the case of financial accounts.

Stock Values for Financial Accounts.

The problem of the annual stocktaking with its dislocation of production and its expense has naturally given point to the possibility of accepting Stock Ledger balances in lieu of a special inventory.

The feasibility of this course depends entirely on the efficiency of the stock scrutiny, for, without a high degree of accuracy in the stock accounts is demanded and obtained, the Stock Ledger can never be relied on for the purposes of the annual trading account.

On the other hand, it should be remembered that an actual inventory taken under the usual rush conditions is quite likely to include some errors as to quantities and descriptions.

If stock accounts are kept, comparison of the book balance at

Stock Values for Financial Accounts.

the date of stocktaking may be made with the inventory and glaring errors discovered.

When the stock accounts are kept under the conditions proposed here, the errors in the stock accounts are very unlikely to be appreciable, and may easily be less than those occurring with a merely annual inventory.

When adequate provision is made each year for doubtful stock and unfavourable market fluctuations of raw material prices, a little extra reservation can conveniently be made to cover the likely errors in the Stock Ledger balances, if these are accepted as the true stock value.

Given an established and efficient system of stock scrutiny, the most careful public auditor could accept a certificate of stock values based on the stock control records.

The pricing and extension would have to be carried out as for an ordinary stocktaking, and compared as to class totals with the stock accounts.

The stock control records may be thrown open to the auditor, so that he may test any item of quantity he desires.

The usefulness of reliable stock accounts for constructing approximate profit and loss statements, quarterly or half-yearly, will be readily appreciated. The building up of an inventory from stock control records would only be necessary for balance sheet purposes, intermediate requirements being met by an abstract of the stock account balances.

Section. IV e

Cost Allocation Accounts.

Functions of Cost Allocation Accounts.

COST allocation accounts are the accounts for allocating the whole of the works expenditure.

To allocate, according to the dictionary, means to allot to each his share. Further, allocation implies the allotting of the whole of the shares, and it is in this sense that the term is so appropriate for the present purpose.

The reason for applying this term is to differentiate between the two stages in costing of cost allocation and cost summarising.

The summarising of costs is dealt with further on, and it may be helpful to anticipate matters to the extent of stating that the summarising is the ledger stage.

A close parallel may be found in Sales Accounts, the invoicing corresponding with the cost allocation stage and the ledger work with the cost summarising stage.

Functions of Cost Allocation Accounts.

Cost allocation, like invoicing, depends for its accuracy on the initial information supplied by despatch notes in the case of invoices, and by time allocation sheets and goods issue vouchers in the case of cost allocation.

The correctness of this basis information is not a matter of bookkeeping, and may be said to be one more of administration.

The attainment of bookkeeping accuracy of cost allocation is only useful if the basis information is right. The means by which this rightness shall be achieved is more appropriately discussed in the earlier portions of this book, being an integral part of efficient routine organisation.

For the most part, therefore, the discussion in this section must presume that correct information is supplied to the Works Accounts Office, so that the accuracy that has now to be catered for is one mainly of bookkeeping.

In giving prominence to this aspect of cost allocation accounts, the object is to emphasise that bookkeeping accuracy is a vital necessity that many costing systems, particularly of the card index variety, seem to leave to chance.

This remark is not intended as any reflection on card index systems for costing purposes, as the flexibility of this mechanism, for mechanism alone it is and not self-operative at that, makes its adoption a highly commendable course.

This question of mechanism, be it cards, removable sheets in binders, or bound books, has a considerable influence on the practicability of any cost accounting system. On the other hand it is hardly the right sequence to select the mechanism before settling on the general principles of a scheme of accounting appropriate to a given works.

Speaking generally, cost figures that are wanted regularly should be accessible from the records without any analysis.

This means that if the costs of individual components are in constant request the cost records must be in unit form, to be aggregated when necessary for obtaining the cost of the complete product. Under such circumstances the card index is about the only feasible means, there being practically no limit to the number of accounts that can be handled in this way.

The more usual conditions are that cost totals are required for complete products or orders more frequently than for individual components. From the bookkeeping point of view the more reasonable number of accounts, resulting from the costing of complete orders, will considerably facilitate agreement of totals and consequent accuracy.

Given a reasonable number only of accounts, the advantage as

Functions of Cost Allocation Accounts.

to mechanism will lie with the adoption of removable sheets in suitable binders.

When the practice is for the cost allocation accounts to aggregate the costs of each order, some sub-divisions become imperative if proper use is to be made of the works accounting system generally. The following sub-divisions will meet the main requirements :

Net Production Costs.
Costs of Drawings, Patterns, Jigs and Special Tools.
Costs of Errors and Defects.
Costs of Final Inspection, Packing and Despatch.

Consideration will be given further on to the scope of these sub-divisions.

Whatever sub-divisions of costs, short of unit component costs, are considered suitable for a particular kind of business, there will still remain a need to embody in the cost allocation accounts sufficient detail to make further analysis possible when required.

The requirements for controlling the costs of individual components by comparison of cost data need not necessarily be met by the cost allocation accounts.

It will be found a sounder practice to consider this function of cost data as belonging to ratefixing. The basis information will be the same, but there will be more freedom in treating the figures, with however some risk of inaccuracy, though comparisons should, as a matter of fact, detect any serious errors.

Net Production Costs.

In the ordinary way the net production costs are often considered as the only costs to be recorded against specific orders, and are synonymous practically with what are termed prime costs.

Prime cost is sometimes held to be the direct wages and material costs exclusive of shop charges, but it is not necessarily a contradiction of the term if prime cost is considered as including the shop charges appropriate to the direct wages involved. To avoid possible confusion, however, these costs are here designated " net production costs."

Obviously some definition is necessary as to the meaning of " direct " costs, and a near approach to a definition will be to state that " direct " materials are those materials actually embodied in the product, and " direct " wages are the wages paid for labour expended in the forming or actual shaping of the product. This is a very narrow definition which, in regard to wages more particularly, cannot be accepted quite literally.

Costs that are not strictly direct and yet enter into net production costs may be conveniently designated secondary materials and wages respectively.

In the case of materials, secondary costs will not figure largely under the majority of works conditions, though the possibility requires consideration. An instance of "secondary" material would be the supplies of fuel and lubricants necessary for the inspection trials of an engine. These supplies obviously do not become embodied in the product. This instance assumes that such supplies are charged to the specific order under which the engine is made or sold, instead of being treated as shop supplies to be distributed over the work done in the department. **Net Production Costs.**

As to "secondary" wages, this is likely to deserve recognition in every works.

Secondary wages will be virtually indirect wages that are charged to orders or product instead of to a works expense account. Thus the wages cost of viewing will be "secondary" wages when charged to a specific order. Whether it should be so charged or allocated is a matter for local decision according to the nature of the business. For mass production, viewing can hardly be treated in any other way than as an expense, whereas on special contracts it will probably be held advisable to include viewing or inspection costs under the respective contracts.

The two other common instances of indirect wages that may be treated partly or wholly as secondary labour are supervision and labouring or assisting.

Where it is felt that these costs should be included under specific orders, the difficulty of allocation may be got over by distributing the respective costs for a given period over the direct hours worked and allocating accordingly. This will, at least, be more nearly equitable than allocating on some approximate report furnished by the men concerned, and will ensure the unfamiliar orders getting their fair burden. The obvious errors in this method in any given week will be probably corrected ultimately for each order during its course in the shops.

To obtain the proper advantage in the cost records from the differentiation of direct wages from secondary wages, suitable provision must be made in the form of the cost allocation account.

The Cost Allocation Sheet needs to be designed to furnish this 5-131. distinction, and provision can also be made for keeping direct machine wages distinct from the direct hand wages. This distinction or dissection entails very little more clerical work, if any, and adds considerably to the usefulness of the total cost figures of any order—particularly for comparison with estimated costs, providing these are also built up under the two heads of machine and hand wages.

The extent to which secondary materials and wages are allocated to specific orders will have some bearing on the shop charge rates to be adopted. The simplest course is to compute the shop charge

Net Production Cost. rates as if all secondary labour were included in works expenses, and then, if need be, to make a rebate on the total shop charges applied to any order, if the amount of secondary material and secondary labour allocated to the particular order is excessive. The method of adjustment would be much the same as when writing back shop charges applied to works additions and experimental work, a matter that is discussed in connection with shop charges. It may be remarked that shop charges are not applied to secondary labour.

In some businesses the treatment of overtime allowances on direct labour will require consideration. It may easily prove very valuable information to have the totals of these allowances on each order, as throwing light on the circumstances under which the order has been carried through. When that consideration does not hold good there will still remain a sufficient reason for distinguishing these charges, namely, so as to keep the direct machine and direct hand wages figures on a basis properly comparable at any date with those of other similar orders.

In the case of secondary labour there will hardly be any occasion to separate the overtime allowances.

Coming to shop charges, this is a question of wide scope, and is discussed elsewhere. For the present purpose it will be sufficient to indicate that the adequate treatment of shop charges involves
5-28. their application to the detail labour charges on the Time Allocation
5-131. Sheets before the labour items are posted to the Cost Allocation
Sheets.

When this routine is followed, there is no difficulty in discriminating to any extent desired between the different classes of work done and the different machines used as to the appropriate shop charge rates.

A point may be made as to the likelihood of sub-divisions of the Net Production Costs being necessary.

These sub-divisions may follow the lines of the sub-orders suggested in connection with the regulation of work-in-progress or of definite portions of the work. The size and character of the order, and the needs of the Estimating Department, will influence the scope of the splitting up attempted.

Sub-divisions under names of the various groups of parts are not likely to be very satisfactory. The use of symbols, which may be, perhaps, the reference number of an assembly unit, as described earlier in the book, will be much the better plan.

Any symbols adopted for the purposes of cost sub-division should be marked on all the works drawings involved, for only by such means can any consistent interpretation of the scope of each sub-division be realised.

Net Production Cost.

The question of sub-division by groups of parts should be settled jointly by the Drawing, Estimating and Works Accounts Offices.

Where sub-divisions corresponding with sub-orders are adopted, it will probably be better to only apply the sub-division to the labour costs, and to merge the material costs in one account under the main order reference, relying on analysis afterwards if necessary. This consideration is recognised in the earlier discussion on sub-orders.

Drawings, Patterns, Jigs and Special Tools.

The sub-division of an order cost covering the cost of drawings, patterns, jigs and special tools represents what may be described as the cost of production preparations that would not have to be incurred on repeat orders. The probability of repeat orders being obtained would, therefore, be the deciding factor in settling whether to leave the whole cost against the original order or to transfer some part of the costs afterwards to Works Additions. A conservative policy is important, as special tools quickly become obsolete on the least variation of design, and repeat orders are apt to be a little different from the original, always supposing that they come along at all.

In the case of special products, few will question the advisability of charging preparation costs to the original order, but in the case of stock products the ruling will not be as generally approved.

The argument for charging the cost of the production preparations to the initial stock manufacturing order for each line of product is to localise the expenditure. Where the line of product is not a really standard one, there may be a doubt if the whole cost of this character should be transferred to Works Additions—subject to that consideration it may be right that the whole costs should be so transferred.

In fixing the price at which stock product shall be charged into stock, some margin should be added for Drawings, Patterns, Jigs and Special Tools. 5-128.

It will be well that these preparation costs should be reviewed in the light of the selling policy to be adopted, or what may be the better sequence, for the selling policy to be the influencing factor in the amount of preparation expenditure that can be allowed, particularly on Jigs and Special Tools. It is, however, a difficult matter to limit expenditure on jigs and special tools beforehand, although there may not be much difficulty in deciding for each component as it comes under review what special equipment will prove economical for the quantity contemplated to be made.

The control of expenditure on jigs and special tools is one requiring the exercise of much judgment by the Management, and the com-

Drawings, Patterns, Jigs and Special Tools.

mercial aspect should be given proper consideration. It is easy to waste money in production preparations for lines that cannot be sold or for which inadequate efforts to sell are made, just as it is possible for a short-sighted policy to blight the selling prospects by not allowing sufficient economy to be exercised in the repetition cost of production, such as an adequate supply of special tools might achieve.

It is not a universal practice for the cost of drawings to be charged to the orders for the product concerned and then transferred to Works Additions through that channel.

Draughtsmen are not unsusceptible to administrative influences, and there may be an actual economy in adopting the practice of charging their time to the specific orders worked on.

Certainly it is not very satisfactory to value drawings in the first instance, except on some basis of cost, and if no inventory value whatever is to be given to drawings the works expenses may be rather unfairly inflated.

Works Additions of the nature of Drawings, Patterns, Jigs and Special Tools will be subject to an annual writing down in value apart from ordinary depreciation, if the sum total of their values in the books exceeds the limit considered by expert valuers as properly proportionate to the turnover of the business. Where conditions allow it, this writing down can be anticipated in part by not transferring the full cost to Works Additions.

For certain classes of manufacture, when large quantities of special articles are produced, the special tools will require renewing and maintaining during the course of the contract, and the same may hold good of the patterns.

From the point of view of possible inventory values it is important that these costs of maintenance shall not be included in with the original costs of the patterns, jigs and special tools dealt with above.

Further, it may be misleading and quite undesirable to debit these expenses to the ordinary works expenses as repairs to loose plant, therefore when the nature of an order requires it a special cost section may be opened.

It is just possible, in consequence of these expenses being specially charged to the order in this way, that there ought to be a rebate in the total of the Shop Charges on that order.

Errors and Defects.

Every order is liable to incur abnormal expenditure in consequence of errors and defects. The errors may be of drawing, of workmanship, of clerical routine or misunderstanding, and defects may refer to design or to materials. Generally speaking, the varieties of mishaps possible in this connection are numerous, and it is very

Errors and Defects.

desirable to separate the cost of same on each order from the net production costs.

When errors and defects arise in the initial stages of a new line of product it may be admissible to transfer some portion of the costs to Developments and Experiments, to be dealt with through the financial accounts at the end of the year.

In contending for a separation of the costs of errors and defects from the net production costs, it should be pointed out that this can only be achieved satisfactorily and economically by estimating in each case from the respective Viewing Reports. The costs as they are incurred will be allocated in the first instance as production costs and adjusting transfers made on the basis of the estimates just referred to.

There may be cases when the cost of errors and defects can be obtained through the ordinary allocation routine by the issue of a special order or sub-order, but to endeavour to divert the costs to the sub-division for errors and defects during the progress of the work is not likely to be successful in the numerous minor instances.

For factories engaged in mass production it will probably be better to treat the costs of errors and defects as a Works expense, but where the products are varied this course is not recommended, as being likely to result in somewhat misleading figures for the respective order costs.

It will be convenient to consider as errors or defects all wasted material and labour consequent on any alteration of design after the shop print has been issued. The cost of unsuccessful special tools or unsuccessful processes may be transferred to the sub-division under consideration, or, it may be, to Developments and Experiments.

Final Inspection, Packing and Despatch.

The necessity for a sub-division of order costs under the heading of Final Inspection, Packing and Despatch will be readily appreciated, though the importance of the sub-division will depend on the nature of the business.

Final inspection may involve trials of an expensive character before the customer will accept delivery. Tests that are made in the ordinary course of production constitute a part of the net production cost. Probably there will be a separate Testing Department in which such trials will be carried out. It will tend to give more useful figures of the production costs if the testing wages are treated as secondary wages.

In the matter of packing and despatch costs, these are not precisely Works costs, seeing that delivery to Warehouse is the real finishing point for the Works, but convenience of administration will usually dictate the inclusion of Warehouse costs and transit charges in the Works accounts.

Works Expenses. With regard to Works expense accounts, the problems of allocation have been already discussed in the course of dealing with Standing Orders for Works expenses.

A point may be made as to the possibility of all three classes of labour, as mentioned in connection with net production costs, appearing in these accounts. The direct machine and direct hand labour will occur on repair jobs. It will tend to a more reliable system if wages that are considered secondary wages when charged to a specific production order, shall be posted under the heading of secondary wages, even when charged to an expense account, although the reasons previously given for doing so may not apply wholly.

Direct machine or hand wages charged to an expense account will not bear shop charges, as this would mean allocating expenses on to expenses. The objection is one of commercial practice and the liability to confusion of accounts.

The costs for each account period will be reported, under each
6-43. standing order reference concerned, on the Works Cost Allocation Abstract.

Works Additions. The costs of works additions should be kept generally in the same form and style as those of production orders.

Consideration is given in the discussion on Standing Orders to the main headings for works additions accounts.

The practice is advocated of issuing Plant Orders for each works addition, and for separate cost allocation accounts to be kept for each such order. The details of the plant order costs, falling under any one of the headings recognised in the financial
5-137. accounts, will be summarised on the Plant Sub-Orders Cost Summary.

It is the more common rule amongst public auditors to admit Works additions at the bare cost of materials and wages only. Shop charges on such wages cannot, under these conditions, be entered in the financial accounts, although shop charges are as truly an element of Works additions costs as of production costs. There is no reason why exception should not be made when extensive additions are carried through by the Works' own employees.

For the sake of knowing the true Works cost in each case, and for making the basis of the shop charge rates more regular, the procedure is strongly recommended of applying shop charges to Works additions costs in the Works accounts, and then writing same back into the Supplementary Shop Charges Account as kept in the Shop Charges Book, before reporting the costs to the Financial Department.

Developments and Experiments.

Coming to the question of the costs of Developments and Experiments, so far as these are derived by transfer from production orders, no further comment is necessary.

For the main part, specific orders will be issued for each substantial experiment, and these will be treated on much the same lines as production orders. It may even be worth while having the same sub-divisions, excepting that for final inspection, packing and despatch.

Generally speaking, it is important to issue separate orders for every experiment, with a view to controlling the expenditure in this direction. An omnibus order may be admissible for minor experiments during a given short period.

To avoid the adoption of a standing order for aggregating costs of this character, arrangements are indicated in dealing with Shop Charges for the Developments and Experiments Account to be kept in the Shop Charges Book. A parallel account will be kept in the financial books derived, as to costs, from the periodical Works Cost Allocation Abstract.

With reference to the application of shop charges to these costs, it is argued that experimental expenditure is a Works expense to be ultimately written off through the *Works Profit and Loss Account*, although for financial reasons some proportion of the year's expenditure may have to be carried forward at the end of the year.

Considered as a Works expense, it will be understood that shop charges may not be applied to these costs, as already indicated in the case of ordinary Works expenses.

For reasons, however, of obtaining inclusive Works costs and for shop charge computation purposes, the same practice is advocated as for Works additions, namely, to apply the regular shop charges in the Works accounts, and to write them back before reporting the costs to the Financial Department.

The object of including the term Developments in the title of the account under consideration is to justify the inclusion of costs that are experimental virtually in regard to methods of production rather than of design pure and simple. The possible transfers to this account from the Errors and Defects sub-division of production order costs, as previously mentioned, will fall into the category of development expenditure.

Commercial Expenditure.

In the matter of expenditure by the Works for commercial purposes, this has been previously discussed under Standing Orders. One further point is necessary here as to shop charges not being applied to work done of this character. From the financial point of view, these are expenses to which it is not permissible to allocate

Commercial Expenditure. Works expenses, primarily because it is not convenient to admit shop charges on such items in the financial accounts. The amount likely to be at issue will be too small to adversely affect the Works expenses totals.

Under exceptional circumstances the Financial Department might be invoiced for such expenditure by the Works, and, in such an event, shop charges could be included in making up the invoice, but it is not necessary to arrange for such cases here.

Cost Allocation Routine. The matter of the cost allocation routine has been explained in part when dealing with Net Production Costs.

One other point remains as to wages costs, namely, the allocation treatment of what may conveniently be called Extra Pay, which may be defined as piecework balances or premiums or bonuses, according to the system in use for remunerating the workers on the basis of output.

Any extra pay system should necessitate viewing or inspection of the work before any extra pay is granted.

The point to be brought out is that viewing certificates, in whatever form expressed, cannot with any satisfaction be given for the
5-31. latter portion of the pay week before the Wages Book is made
up.

The work of computing the extra pay cannot very well be handled simultaneously with the calculation of the time wages without excessive staff, whereas by deferring payment until the week following the completion of the respective jobs, the office work in this connection can be accomplished before the ordinary wages work.

This arrangement will allow the viewing to be carried out more effectively by not entailing a rush on a particular day. It will be a matter of administration to ensure that the net result is not any dilatoriness in getting viewing through.

Following from these considerations, it will be distinctly advantageous for the extra pay items to be furnished quite independently
5-28. from the Time Allocation Sheets, so that the latter may be free for cost
allocation purposes. A further substantial advantage is the increased facility for agreeing the cost allocation totals with the wages paid, and for this purpose the wages paid are dissected in the
5-116. Works Expenditure Book under the two headings of Ordinary
Wages and Extra Pay.

When special allowances are paid, such as for engine and boiler trials, it may be convenient to treat these charges, for cost allocation purposes, along with extra pay, even though these allowances are not likely to be held over for a week. Probably the only advantage to be gained from this course is to avoid having to include these allowances under a heading not strictly appropriate and so rather spoiling the consistency of some other figures. **Cost Allocation Routine.**

Material costs call for dissection under the headings of Special Materials (or materials charged direct to orders on purchase), Ordinary Materials from General Stock, and Components from Component Stock. Process products, such as castings and forgings, advantageously have a separate heading, although in the nature of special materials.

Secondary material will almost invariably be from general stock and may, therefore, be provided for on the same sheet as other issues from general stock.

Disbursements constitute an element of costs apart from materials, wages, and shop charges, as previously discussed. The allocation routine is straightforward, entry being made from the Cash Reports 5-120. to Works or from the Disbursements Book, according to whether 5-121. the disbursements are in ready cash or not.

The Cost Allocation Sheet used for materials charged direct may 5-129. conveniently be used for disbursements.

The cost allocation routine may be resolved into three stages, and it will be convenient to use separate sheets for each stage under the respective order references. This will give a valuable flexibility in the Works Accounts Office arrangements and locate responsibility for accuracy.

The stages may proceed simultaneously and should do so when necessary to expedite the accounting. The promptitude with which the costing routine can be effected is a vital factor in justifying the compiling of costs and must be a deciding factor in the system adopted. The present proposals will accomplish the necessary promptitude, if properly administered, and at the same time will furnish accurate and complete accounts—not always attained by methods which consider rapidity of result alone.

The stages may be conveniently tabulated as below, together with notes of the medium through which the information as to correct allocation is furnished to the Works Accounts Office. The names of the forms given are not essential any more than a particular size or style of form is essential. The idea is to symbolise the principles underlying the routine by indicating specific forms with titles as appropriate as possible to their real functions.

The stages submitted for the cost allocation routine are founded on a considerable experience, but that is not to say that in every Works Accounts Office the work ought to be or even could be split up in this way. There is, however, likely to be considerable gain in the smooth running of a complete system of Works Accounts if the stages indicated are adopted in principle if not literally.

Cost Allocation Routine.

Cost Allocation Routine.

	STAGE.	COST ANALYSIS.	MEDIUM OF ALLOCATION.
5·82.	I (5·129.)	*Purchases charged direct.*	Goods Received Notes duly completed as to purchase costs from Suppliers' Invoices, and supported by Goods Issue Vouchers as to actual use of the goods, unless their use can be taken as originally intended when ordering, as in the case of plant. In the case of forgings and castings purchased outside it will be better to treat such purchases under Process Products along with the firm's own production of forgings and castings and the like. Returnable packages may be dealt with under this heading. See previous discussion.
5·71. 5·73. 5·77. 5·78.		*Process Products charged direct.*	Product Delivery and Daily Work Sheets. It may be sufficient in many cases to allocate according to the original Foundry or Smithy Order, and assume that the products are not diverted in any instance to an order other than that originally intended. Alternatively, Goods Issue Vouchers will be necessary in each case.
5·120.		*Disbursements.*	Cash Report to Works as to cash disbursements.
5·3.			Weekly Staff Reports duly extended to correspond in total with entries in Cash Reports to Works. The allocation of the salaries of officials may, if preferred, be indicated on the Cash Report to Works without disclosing names—the total salaries of several officials being possibly merged for this purpose.
5·121.			Disbursement Book, when duly completed as to amounts from the respective debits and Demand Notes.
5·86.	II (5·130.)	*General Stock Materials.*	Goods Issue Vouchers duly priced in accordance with the General Stock Accounts.
			Departmental Reports, which may be more convenient than Goods Issue Vouchers in the case of Fuel, Process Supplies, Paints, Building and Millwrights' Supplies.
5·88.			Timber Tickets, being a special edition of Goods Issue Vouchers, for issues of Timber. These may possibly be made out by the mechanic (carpenter or patternmaker), and possibly priced by the department foreman.
5·87.			Shop Credit Slips for crediting returns from the shops.
5·86.		*Component Stock Goods.*	Goods Issue Vouchers duly priced in accordance with the Component Stock Accounts.
5·48.			Assembly Lists, which may be used for repetition work when all components are passed into stock prior to assembling.
5·111.			Warehouse Daily Report of Despatches from Stock.

Cost Allocation Routine.

Cost Allocation Routine.

STAGE.	COST ANALYSIS.	MEDIUM OF ALLOCATION.	
III (5-131.)	*Direct Machine Wages.* *Direct Hand Wages.* *Secondary Wages.* *Overtime Charges.* *Shop Charges.*	Weekly Time Allocation Sheets duly extended at wages rates and shop charge rates. The posting of the wages items under the proper analysis headings will be greatly facilitated by the use of distinctively coloured Weekly Time Allocation Sheets.	5-28.
	Extra Pay (Machine). *Extra Pay (Hand).*	Extra Pay Book in which the earnings are indicated in just sufficient detail for proper allocation. A carbon copy can be arranged so as to furnish an Extra Pay Slip for each man concerned.	5-29.
	Special Allowances.	Special Allowance Book on the lines of the Extra Pay Book with carbon slips for the men.	

Cost Allocation Agreement.

Emphasis has already been laid on the necessity for accuracy in the cost allocation accounts, and, as a matter of book-keeping accuracy, this means agreement of totals at frequent periods.

A fortnight is the period recommended for works accounts. So far as this may seem a short period to adopt for agreement purposes, in view of the large number of totals to be extracted and added together, it should be borne in mind that mechanical means for figure additions are available, and will go far to make a frequent agreement a matter of ease. It is only by frequent agreement that an all-round accounting accuracy can be maintained, and only by mechanical means can the best results as to promptitude be obtained economically.

The process of cost allocation agreement is quite straightforward, and may be at once tabulated.

It will be remembered that the cost allocation accounts, as a whole, have to agree with the Works Expenditure Account. There is, however, in connection with stock material, an intermediate process, whereby the cost allocation of stock goods (Stage II. of the Cost Allocation Routine) has to be agreed with the stock accounts as to goods issued from stock.

Cost Allocation Agreement.

Cost Allocation Agreement.

COST ALLOCATION STAGE.	COST ANALYSIS.	AGREEMENT PROCESS.
	Purchases Charged Direct. *Process Product Charged Direct.* *Disbursements.*	Totals of cost allocation accounts against totals under respective headings in Works Expenditure Book.
II	*General Stock Materials.* *Component Stock Goods.*	Totals of cost allocation accounts against total issues entered in the respective Stock Ledgers (viz. General Stock or Component Stock).
III	*Direct Machine Wages.* *Direct Hand Wages.* *Secondary Wages.* *Overtime Charges.*	Totals of cost allocation accounts, under these headings, grouped together in one total against the total Wages as per Works Expenditure Book.
	Shop Charges.	Totals of cost allocation accounts against summary of shop charges taken from the Weekly Time Allocation Sheets. The accuracy of the shop charge detail extensions on these sheets can be tested by confirming the total extensions on each sheet.
	Extra Pay (Machine). *Extra Pay (Hand).* *Special Allowances.*	Totals of cost allocation accounts against the total Extra Pay and Allowances, as per the Works Expenditure Book.

Cost Summaries and Cost Ledger.

Enough has doubtless been said to make clear that the function of cost summaries, in the sense used here, is the stage of cost accounting in which the sectional costs as allocated for each account period are collected together under headings suitable for financial account purposes.

It is of some importance that cost figures should accumulate under the respective sales order numbers, so that on completion of each order the total works cost shall be available for ascertaining the gross profit. Sales from warehouse stock may have to be aggregated for each fortnight to avoid an excessive number of cost accounts.

It is proposed to identify the book containing the cost summaries
5·132. as the Cost Ledger.

The term cost ledger is in practically universal use as the completing stage of cost accounts, but its functions necessarily vary

Cost Summaries and Cost Ledger.

according to the development of the earlier stages. Quite frequently all the material is detailed in the cost ledger, while the wages are only entered in periodical totals.

The lines followed by the present system place no restraint on the number of sub-sections of costs in the cost allocation accounts, but as a corollary the cost ledger becomes concerned only with the section totals instead of the actual detail items.

This procedure is sound in that it clears the way for refinements in the matter of sub-dividing the cost accounts, and allows those refinements to be applied to any degree or to any order or class of order without disturbing the routine in connection with the Cost Ledger.

As to the argument that to deal with the whole of the cost accounts in the two stages of cost allocation accounts and cost summaries is to increase the number of sheets to be used and so to complicate the system of accounting, it must be borne in mind that facilities for agreeing the detail entries may be more important than to aggregate every detail at one point. The preceding discussion will have indicated the usefulness of the cost allocation stage in agreeing the accuracy of the figures each fortnight instead of letting the task accumulate by deferring it, with the consequent risk meantime of serious book-keeping errors being unobserved until after some important use has been made of the figures.

From the administrative point of view the extended use of sub-sections in the cost accounts proportionately enhances their value for estimating purposes, but to keep the total for each sub-section distinct in the cost ledger would add greatly to the book-keeping, beside complicating the form of the accounts. The alternative of carrying forward totals on each cost allocation sheet for the respective sub-sections would tend to endanger their usefulness for the purposes of fortnightly agreement.

The recommendation that is made is a compromise. Sub-section cost allocation accounts will be totalled each fortnight and those totals summarised under a main account in the cost ledger. Consequently, to arrive at the total cost of a particular sub-section, the fortnightly figures must be abstracted specially from the cost allocation accounts and their completeness verified by checking with the sub-section entries in the cost ledger. As an alternative, if much detail is not required, the sub-section entries may be extracted from the sectional accounts in the Cost Ledger.

This compromise is justified in that it obviates delay in preparing the cost ledger accounts. Further, it is quite unlikely that every sub-section cost will be consulted, as such, for estimating or any other purpose, and all ordinary requirements are met by having

Cost Summaries and Cost Ledger.

the data accessible whenever it may be required. This is, of course, altogether better practice than depending on the dissection of subsection costs from a great mass of detail.

Cost Allocation Transfers.

For various reasons transfers of cost allocations may be necessary, and the following are typical cases :

When items of work in progress are transferred from the original order to some more urgent order.

When two or more sales orders are coupled for manufacturing convenience and the costs have afterwards to be split up.

When adjustments are necessary on account of defective material.

When the cost of Drawings, Patterns, Jigs and Special Tools is deemed to be in part, or wholly, chargeable to Works Additions.

When shop charges have been applied to work which the Financial Department do not accept as eligible to carry shop charges, such as Work Additions and Experiments.

When abnormal expenditure on a Sales or Stock Manufacturing order is considered as chargeable to Developments and Experiments.

When it is elected to charge a repeat order with some part of the cost of Drawings, Patterns, Jigs and Special Tools that have been previously transferred to Works Additions from the original order.

When indirect costs have been charged to an order unfairly, such as overtime charges, secondary labour, shop supplies, and special tool maintenance.

When Work Additions are of an experimental nature and part, or all the cost, is considered chargeable to Developments and Experiments.

When it is desired to equalise expense expenditure over the fortnightly account periods of expenditure that has reference to a longer period, *e.g.* insurance premiums.

When it is necessary to anticipate expenditure to equalise the fortnightly expense accounts, *e.g.* rent.

When costs under Works Additions are found to require adjustment before being entered in the financial books.

It is obviously desirable to exclude these transfers from the cost allocation accounts, particularly so as to avoid having to split up the costs of materials and labour under the subsidiary headings used in those accounts. It will, therefore, be convenient to make the transfers in the Cost Ledger, where sufficient detail must be given to explain the occasion of the transfer. It will be necessary to show the proportions pertaining to materials, disbursements, wages and shop charges under those headings, for it is only in that form the adjustment can be accepted in the financial accounts.

While it may be possible to make these transfers in the Cost Ledger, without providing any other record, it is much more convenient to first record the items in a Cost Transfer Journal and to post to the Cost Ledger from that source. 5·133.

In the case of defective work, entries will be considerably minimised by allowing the Viewing Reports to accumulate for the fortnight and to aggregate the items for each order concerned in the Cost Transfer Journal—posting only totals to the Cost Ledger. 5·98.

Balancing Cost Ledger.

The balancing of the Cost Ledger is a process that is of a precautionary nature rather than a clearly defined step in the

Balancing Cost Ledger.

accounting system. To that extent it must not be confused with balancing in the sense used in the financial accounts. The function of the financial accounts really limits the Cost Ledger to being merely a cost summary as originally described.

By means of the Works Cost Allocation Abstract the fortnightly costs under all standing orders covering Works Additions and Works Expenses, are entered directly into the financial accounts.

In the case of the orders series, viz. Sales, Sales Repairs and Sundries, Stock Manufacturing and Experimental and the Process Accounts, the financial accounts deal only with the total cost allocations for each series, and the figures for the individual orders do not appear in the financial accounts.

The Cost Ledger has to serve as the summary of the work in progress at any time. Such a summary might be built up from a list of the orders in progress at the time, but the better way is to be able to make the summary from the Cost Ledger and to check it as to items from a list of orders recognised by the Works as in progress. Then, as a final stage, if the Annual Balance Sheet is in question, to verify the value of each item by careful scrutiny of the work in the shops.

The total on each account in the Cost Ledger should stand for the value of the work in progress.

This means that the works value or cost of every delivery under each order number should be entered in the Cost Ledger by way of off-setting the costs allocated to the order.

In the case of Stock Manufacturing Orders there may appear, after an order has been completed and deliveries booked off, a balance of costs against the order which obviously will not be represented by any work in progress. The balance will then represent the difference between the costs allocated and the works value of the product.

The stock product will be priced at a works value, derived by averaging the costs under several orders, or at the value, whichever may be the lesser, that the product will realise when sold after allowing an adequate margin for commercial expenses.

Following from this, the differences on Stock Manufacturing Orders may sometimes appear as a profit and sometimes as a loss.

In the financial accounts these differences can only be recognised in their combined influence on the certified work-in-progress values, for the series of stock manufacturing orders, as a whole, at any stated time.

To clear the completed orders in the Cost Ledger immediately,

Balancing Cost Ledger.

and to qualify the estimated or book value of the work-in-progress at the end of each fortnight, it is desirable to post these differences to some suitable memorandum account. The Shop Charges Book is a convenient medium for such an account, which is termed Stock Manufacturing Differences Account. As a matter of fact, all accounts in this book are of a memorandum character.

The procedure outlined for stock manufacturing orders applies equally to the process accounts, except that the differences will be only ascertainable when the work-in-progress is actually verified. This is not a matter involving very much labour and should be done frequently.

Deliveries or output under Stock Manufacturing Orders and
5-119. Process Accounts are recorded in the Works Expenditure Book, and reported to the Financial Department by means of a Works
6-44. Product Abstract.

Turning to Sales Orders and Sales Repairs and Sundries Orders, particulars of deliveries may be notified to the Works Accounts
5-112. Office by a copy of the Packing Slip. These deliveries can be
5-138. summarised on a Delivered Orders Cost Abstract, under any suitable classification. When the delivery completes an order the total costs can be extracted from the Cost Ledger and accordingly noted, thus balancing the respective account.

When only a partial delivery has been effected, it will be desirable to enter the proportionate costs. As an estimate the figure used should err on the high side so as to ensure, if possible, that the final cost of the remainder of the order shall not disclose a loss, when the costs entered against the first delivery may have indicated a favourable state of affairs.

Circumstances will vary as to the convenience of taking out the costs of partial deliveries, but there would seem little doubt that any partial delivery that can be invoiced should have its costs carefully apportioned and entered on the above-mentioned Abstract and noted in the Cost Ledger. Partial deliveries that are not costed in this way must be carried forward on the abstract, and the Cost Ledger should be noted accordingly.

Returning to the case of Standing Orders, while these are effectively balanced by being reported for treatment in the financial accounts, it is necessary to also make identical memorandum entries in the Shop Charges Book, and as these entries must be complete for determining shop charge rates and surveying works expenses—it will be necessary to note in the Cost Ledger the postings to the Shop Charges Book as well as to the Works Cost Allocation Abstracts.

Balancing Cost Ledger.

The routine of balancing the cost ledger may be recapitulated as follows :

BALANCING OF COST LEDGER.

Sales Orders, - - Series	**A.**	Balanced by posting to Delivered Orders Cost Abstract.	5-138.
Sales Repairs and Sundries Orders, - - - ,,	**B.**		
Stock Manufacturing Orders ,,	**C.**	Balanced by entries in Works Expenditure Book and posting of differences to Shop Charges Book.	5-119.
Experimental Orders, - ,,	**D.**	Balanced by posting to Delivered Orders Cost Abstract.	5-138.
Process Cost Accounts, - ,,	**G.H.K.**	Balanced by entries of output in Works Expenditure Book and posting of differences to Shop Charges Book. Memorandum entries also made in Shop Charges Book.	5-118.
Works Additions, - - ,,	**N.**	Balanced by posting to a Plant Sub-Orders Cost Summary each fortnight. After the necessary cost transfers have been made the resulting totals are entered on a Works Cost Allocation Abstract and also in the Shop Charges Book.	5-137.
Works Repair Expenses, - ,,	**R.**	Balanced by posting to Works Cost Allocation Abstract. A memorandum record also posted to Shop Charges Book.	6-43.
Works General Expenses,- ,,	**S.**	Balanced by posting to Works Cost Allocation Abstract. A memorandum record also posted to Shop Charges Book.	6-43.
Work Sundry Accounts, - ,,	**U.**	Balanced by posting to Works Cost Allocation Abstract. A memorandum record of certain items being also kept in Shop Charges Book.	6-43.

Cost Ledger Agreement

The method advocated for agreeing the Cost Ledger is to agree the balances, virtually on the lines of financial accounts. To follow this plan means using inclusive totals instead of the separate totals of materials, disbursements, wages and shop charges. There is, however, no objection to this, as the keeping of the Cost Ledger should be in hands that are unlikely to make errors, and when they occur must be investigated and discovered.

In this connection mechanical means of abstracting and totalling can be applied with great advantage.

As previously stated, the cost ledger balances should represent the value of the work-in-progress, but an independent Work-in-Progress Report is necessary for financial account purposes. This has reference to the annual report incorporated in the Works Account 6-45.
Annual Abstract, which has to give certified details. Subject to proper scrutiny by the Works Accounts Office, the fortnightly Cost Ledger balances are very serviceable for administration purposes and particularly at the half year when preparing an Approximate Profit and Loss Account.

Shop Charges.

Definition of Shop Charges.

SHOP Charges, in the sense used in this book, may be defined as the charges properly applicable to the items of factory product to cover their proper share of those works expenses which cannot, with accuracy, be allocated direct to the orders under which the product is made. In other words, shop charges represent the allocation of works expenses.

In the financial accounts all Works expenses must be allocated to the factory output as a whole for the year. If the Works accounts have under-allocated or over-allocated the total Works expenses, then adjustment must be made of the total shop charges, as applied to each orders series, so as to correct the allocation. This adjustment or supplementary allocation will be reported on the Works Accounts Annual Abstract from a Shop Charges Supplementary Account kept in the Shop Charges Book.

It may be argued that the primary aim of Shop Charges should be to allocate as closely as possible the Works expenses for each account period, and to leave a minimum of supplementary allocation to be done at the end of the year. Taking the year through this is a correct objective, but in regard to items of product the important consideration is that they shall each have only their fair and proper share of works expenses allocated to them. It will be understood that by items of product is meant the specific orders under which the items are manufactured and ultimately priced as to their individual works value.

Obviously the procedure hinges on the interpretation of the words fair and proper, and it is round this point that there has been so much dispute about costing systems. Enquiry into the matter will be facilitated by dealing with the discussion under the following six heads :

1. To determine the character of the expenses that shall be considered as Works expenses.
2. To determine to what extent the apportionment of Works expenses to various departments can be based on ascertainable facts.
3. To determine a suitable basis for apportioning Works expenses of a general character to the various departments.
4. To determine the basis for apportioning the departmental expenses to the respective producing units in each department.
5. To determine on what basis to apply the shop charge rate for each producing unit.
6. To determine to what extent average figures of Works expenses shall be used in assessing the respective departments at any given time.

Definition of Works Expenses.

Taking the first stage, Works expenses may be defined as the total expenses pertaining to factory production up to and including the despatch of the product from the Works. All expenses outside these may be conveniently termed commercial expenses. Some compromise is, however, inevitable if a convenient dividing line is to be drawn between the two kinds of expenses.

Definition of Works Expenses.

The dividing line of administrative responsibilities is the natural one to follow and, therefore, it seems right to consider as commercial all the expenses pertaining to selling, financial accounts, general office work and correspondence, other than the Works Manager's correspondence, which, it may be assumed, will be conducted in the Works Office—the expenses of which will fall under Works Administration.

If the buying is done under the Works administration, then the expenses of buying fall into Works expenses, but under the more usual circumstances, when the Buyer is on the commercial staff and outside the jurisdiction of the Works, the expenses of his department are most conveniently treated as commercial. The fact that his duties as a buyer are directly on behalf of the Works, and to their instruction mainly, may theoretically support the inclusion of the buying department staff charges in the Works expenses. It may also be argued that there are other expenses seemingly commercial that should be borne by the Works.

Instead of any attempt at theoretical splitting of expenses that after all are entirely general in character and cannot be allocated on much else than an arbitrary basis to the items of product, it is quite the better way to adhere to the lines dividing the commercial administration from the Works or manufacturing administration.

Estimating is another expense that is on the border line, and a decision based on convenience is as justifiable, under ordinary circumstances, as any refinement in dissection.

Works accounting, on the lines developed in this book, should be so integral a part of the Works administration that the expenses in connection therewith cannot be very well considered as other than Works expenses. When, however, the Works accounts are considered as merely an accessory of the financial accounts with no intimate co-ordination with the Works management, it will be probably more equitable to treat the expenses pertaining thereto as commercial expenses.

A list of standing orders for representative classes of works expenses has been given, and in conjunction with the notes against each it should be clear what items are considered as Works expenses.

Some doubt could arise over Rents, Rates and Taxes, but, if it is not convenient to apportion such expenses between the commercial offices and the Works, it will not matter very much usually if the Works take the whole burden.

Work expenses for any given factory cannot very well be compared with any outside figures and, so long as they are consistent in their scope from year to year, there is not any very serious objection to regularly including some general commercial expense. Where the

Definition of Works Expenses.

division can be made easily, or the circumstances make it obviously desirable to do so, then by all means apportion joint expenses to the proper quarter.

The important point is to locate responsibility for expenses, and there should be no thought of allowing joint expenses to be borne wholly by one party if responsibility overlaps in consequence. Rent, Rates and Taxes, to keep to the illustration cited, are not controllable in the ordinary sense of the term, and responsibility is, therefore, not affected if the Works, as the predominant partner, bears the whole burden.

The stress laid on these points is intended to bring out the necessity of tackling the question of shop charges in a spirit of practical compromise instead of seriously attempting purely academic ideals. It must be remembered that all costs are, at best, approximations, and, therefore, the Works accounting system must be devised to give approximations that are sufficiently close to meet the real requirements of the business.

So far as shop charges are concerned, there are methods in use that cannot be described with fairness as approximations of even a crude character.

Tabulation of Works Expense Groups.

It will be convenient, before proceeding further with the enquiry, to tabulate the typical classes of works expenses in groups that will allow of their being focussed better.

The groups may be defined as "services,"* if considered broadly, and the titles selected will be seen to be reasonably expressive. The third group, Producing Unit Service, has rather an arbitrary title, though the items included have particular reference to the producing units of the Works plant, as distinct from power and other plant of more general service, and, therefore, dealt with under other heads. The group called Contingency Service involves stretching the meaning of the term service, but may be excused on the ground of convenience. It is obviously very important that the contingencies in question shall not be overlooked in dealing with the matter of shop charges.

In the following table provisional formulas, or bases, for the apportionment of the respective class totals to the various departments of the Works are included for convenience, although the discussion relative to such formulas has yet to be given.

Standing order numbers are given for most of the classes, not as in themselves important, but by way of cross reference to the notes given previously under Standing Orders as to the possible scope of each class.

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* Hamilton Church, the well-known writer on this subject, terms these services "production factors," and the producing units he calls "production centres."

Tabulation of Works Expense Groups.

Tabulation of Works Expense Groups.

Group.	Standing Order No.	Works Expense Class.	Provisional Basis or Formula for apportionment to Departments.
Building Service	R 2-1	Repairs—Land and Buildings (less Power Dept. Bldg. if separate).	By percentages based on Works Manager's estimate.
	R 2-5	Repairs—Pipe Transmission.	By percentages based on relative departmental original values of plant concerned.
	R 2-6	Repairs—Transportation Plant.	By percentages based on relative departmental original values of plant concerned.
	R 2-7	Repairs—Shop Fixtures.	By percentages based on relative departmental original values of plant concerned.
	—	Depreciation on capital value of plant named above.	On same basis as repairs.
	—	Provision for expiration of lease.	By apportionment according to the individual value and age of the buildings.
	S 1-3	Heating Expenses.	By percentages based on relative departmental original values of plant concerned.
	S 1-4	Lighting Expenses.	By percentages based on relative departmental original values of plant concerned.
	S 2-1	Building Attendance.	By percentages based on relative departmental original values of plant concerned.
	S 3-1	Rent, Rates, Taxes, Fire Insurance and Prevention.	By percentages based on relative departmental original values of all buildings and all plant taken together.
Power Service	R 2-1	Repairs—Power Dept. Building.	Grouped together in one sum and apportioned by percentages based on Power Department's report confirmed by Works Manager.
	R 2-2	Repairs—Motive Power Plant.	
	R 2-3	Repairs—Mechanical Transmission.	
	R 2-4	Repairs—Electrical Transmission.	
	—	Depreciation on capital value of plant named above.	
	S 1-1	Power Generation Expenses.	
	S 1-2	Power from outside sources.	
	S 2-2	Mechanical Plant Attendance.	
	S 2-3	Electrical Plant Attendance.	
	S 2-4	Belting Attendance.	

Tabulation of Works Expense Groups.

Tabulation of Works Expense Groups—Contd.

Group.	Standing Order No.	Works Expense Class.	Provisional Basis or Formula for apportionment to Departments.
Producing Unit Service.	R 2-8	Repairs—Special Process Plant.	According to Cost Allocation Accounts.
	R 2-9	Repairs—Machines.	By percentages based on relative departmental original values of plant concerned, or possibly according to Cost Allocation Accounts.
	—	Depreciation on capital value of plant named above.	On same basis as repairs.
Tool Service.	R 1-1	Repairs—Patterns.	The costs under these headings are likely to be of a minor character, if the main charges are booked against the specific order occasioning the repairs. The apportionment in any case can follow, with little error, the lines adopted for Loose Plant Repair Costs.
	R 1-2	Repairs—Jigs and Special Tools.	
	R 3-1	Repairs—Loose Plant.	By percentages based on relative departmental replacement values of plant concerned, or possibly according to Cost Allocation Accounts.
	S 2-5	Tool Dressing and Sharpening.	These costs should probably be apportioned almost wholly to the machining departments, but if no clear distinction exists, the apportionment basis can be the same as per Loose Plant Repairs.
	—	Annual loss in value of plant concerned as disclosed at stocktaking.	On same basis as Loose Plant Repairs.
Material Service.	S 4-1	General Stores and Warehouse Expenses.	By percentages based on relative departmental totals of direct production hours.
	S 4-2	Sundry Carriage and Package Expenses.	
	S 4-3	Material Testing and Treatment.	
	S 4-4	Timber Preparation and Storage.	Total to Woodworking Departments.
	S 4-5	Interdepartmental Transportation.	By percentage based on Works Manager's estimate.

Tabulation of Works Expense Groups.

Tabulation of Works Expense Groups—Contd.

Group.	Standing Order No.	Works Expense Class.	Provisional Basis or Formula for apportionment to Departments.
Departmental Service.	S 2-6	Plant Removals and Alterations.	According to Cost Allocation Accounts.
	S 5-1	Accident Compensation.	By percentage based on relative departmental wages totals.
	S 5-2	National Insurance Expenses.	According to departmental wages sheets.
	S 6-1	Shop Stores Expenses.	By percentage based on Works Manager's estimate.
	S 6-2	Shop Supplies (General).	According to Cost Allocation Accounts.
	S 6-3	Overtime Charges.	
	S 6-4	General Labouring.	
	S 6-5	Shop Supervision and Inspection.	
Administration Service.	R 3-2	Repairs—Office Equipment (Works).	By percentage based on relative departmental totals of direct production hours.
	—	Annual loss in value of above as disclosed at stocktaking.	
	S 3-2	Works Management and Administration.	
	S 3-3	Drawing Office General Charges.	
	S 3-4	Works Stationery.	
	S 3-5	Sundry Minor Expenses.	
Contingency Service.	—	Estimated Guarantee liabilities on year's products.	By percentages based on relative departmental totals of direct production hours.
	—	Development and Experimental expenditure not carried forward at end of year.	
	—	Reservation for bad and doubtful stock disclosed at stocktaking.	

Ascertainable Incidence of Works Expenses.

The next or second stage is to determine to what extent the apportionment of expenses to the various departments can be based on ascertainable facts.

Easy as it is to realise in the abstract the certainty that the different items of expense vary in their true incidence on the production of each department, there is difficulty in arriving at a proper method of placing a definite value on the share of each class of expense that should be borne by each department.

There are, of course, some expenses, such as Shop Supplies, General Labouring, and Shop Supervision which can quite easily be recorded in separate accounts for each department, and, because of their unquestioned incidence, such expenses are sometimes distributed over the production of each department quite independently of the more general Works expenses.

Works repair accounts also are frequently kept separate for each department, and, if sufficient trouble is taken by all concerned, there is no reason why the resulting figures should not be accepted as giving a correct apportionment. The necessary conditions as to carefulness in allocation of costs is not, however, always observed, and deceptive figures may be obtained without anyone's suspicion being aroused.

Allowing that accuracy in this allocation can be relied on, the departmental figures are of limited usefulness, particularly for short periods. This is mainly because the expenditure fluctuates so much.

If the fluctuations in departmental costs in this connection are corrected by averaging over the account periods that have elapsed, the figures will be much more equitable as to the share of repair expense to be borne by the production of the current period.

This means departing from the usual conception of a departmental repairs account, and a yet further departure may be advantageous under most conditions, viz., to keep separate repair accounts for each main group of plant and then to apportion the current expenditure among the whole of the departments according to the original value of the respective plant items contained therein.

This is an averaging process of a kind that is the more desirable when all works repairs are dealt with by one department, and, therefore, when the responsibility for the sum total of repair expenses can be centralised.

The splitting up of the plant accounts into groups on the lines suggested does not involve many accounts, if each account serves the whole works, but would possibly mean too many accounts if departmental sub-accounts are required in each group. As already proposed, special process plant repairs would under most circumstances require separate departmental sub-accounts.

Ascertainable Incidence of Works Expenses.

It is a point of considerable importance that the divisions of the expense accounts shall facilitate administrative control, and it will be appreciated that grouping the plant repair expenses in this way and then working out the repair costs as a percentage of the original values furnishes a valuable basis for comparison.

Rent is an expense that would appear to be easily apportioned with accuracy to the respective departments on the basis of area occupied. Under some conditions this would be substantially true, but usually area will be no sort of index to the proper incidence of the rent, and the original cost of the respective buildings may have to be accepted as the only simple alternative.

Again, rates levied by the local authority take cognisance of the plant located in the various buildings, though no uniformity of practice exists as to the method of assessment. Obviously the incidence of the rates on each department does not follow areas, even if the rent does, and there is little alternative to adopting a formula based on the relative departmental original values of buildings and plant taken together.

As a reasonable compromise it is suggested that both rent and rates be apportioned on the basis of buildings and plant values taken together.

Depreciation is an expense that lends itself to simple arithmetic in the departmental apportionment, providing, of course, that the capital value of buildings and plant in use by each department is known. It is also assumed that the annual depreciation is taken at flat rates for each group of plant, a condition virtually enforced if the financial accounts are to be kept on convenient lines.

Extra depreciation found necessary, when plant is discarded, to meet the difference between the capital or book value and the realisable value can very well be recorded against the department concerned.

Power expenses constitute an excellent example of the difficulty in the way of a strictly accurate departmental apportionment, except, possibly, in those cases where the whole of the power used is electrical and when the consumption by each department can be recorded by meter.

No one will question that power consumption is a definite factor in any department's expenses for which there ought to be a precise cost available. As a matter of fact the real cost of power for even the whole works is not furnished by many systems of costing, the indirect expenses being insufficiently admitted, so that the departmental shares under such conditions cannot be approximately accurate. Apart from that possibility there will be, under most works conditions, little alternative to estimating each department's

Ascertainable Incidence of Works Expenses.

share of the total power costs, if only by reason of the supplementary consumption of power by such services as are required by hydraulic and pneumatic plant, steam hammers, heating, and the losses occasioned in transmission to the department.

Although frequently revised estimates by a qualified person should be quite satisfactory for accounting purposes, it has to be admitted that the mental conception of a precise departmental power consumption cannot usually be expressed in equally precise figures.

Apportionment of Works Expenses to Departments.

The third stage of the enquiry is to determine a suitable basis for apportioning to the various departments those works expenses which are admittedly of a general character.

5-135. There is little alternative to the adoption of formulas, and, when these formulas are settled after intelligent consideration, they will undoubtedly approximate closely to the real facts of the case.

It is possible to make some suggestions as to formulas suitable for application to representative classes of works expenses.

The suggestions offered have been already embodied in the table of Works Expense classes, and are intentionally as simple in form as possible, with a view to the apportionment being carried through as a matter of works account routine every fortnight.

This is admittedly a very short period over which to survey expenses, but it allows of tendencies being detected before it is too late. Provision has already been indicated for equalising expenses that cover longer periods than a fortnight.

The treatment suggested for power service expenses is so broad as to require careful judgment in its application. Power conditions vary too widely for any definite suggestion to apply generally.

The use of direct production hour totals as the basis for apportioning some of the expenses is recommended on the ground that time is the one common factor of expenses and production. Expenses necessarily vary directly as the length of period covered or, approximately, as the number of hours worked.

Direct production time may be described as the time occupied on the formative processes that influence the form of the product.

" Direct Labour " and " Productive Labour " are terms frequently applied in this connection, and there is not much room for improvement on the former term.

The reason for referring to direct production hours rather than direct labour hours is to associate the reference with the producing units, which will sometimes be men and sometimes machines. When one man operates a group of machines, the machine hours will constitute the direct production hours. In another case there may be two men operating one machine, and in both cases the direct production hours more obviously indicate the machine hours than would direct labour hours.

Apportionment of Works Expenses to Departments.

Judgment will be helped in criticising the effect of using the suggested or other formulas for apportionment to departments if separate plans of the works are used for each of the eight services or groups of expense.

The respective amounts apportioned for a given period can be written on the plan of each building, plant location being indicated and due regard paid to the existence of galleries and upper floors, if any. The idea is to bring relative areas within the review, and generally to stimulate the mental conception of the physical conditions of each department.

Apportionment of Departmental Expenses to Individual Producing Units.

The next or fourth stage is to determine a basis for apportioning departmental expenses to the individual producing units in the respective departments.

The question of what constitutes a producing unit will hardly be in doubt in any particular department.

In the case of hand work, the worker may be said to be the producing unit, with the aid of such accessories as benching and hand tools.

In the case of machine work, it is convenient to think of the machine as the producing unit and the operator as the accessory, so that there will be no confusion of ideas when one operator tends several machines, or when more than one man is required to operate a single machine.

While the distinction as to hand work and machine work will be clear in the majority of cases, there will be some men who alternate between one and the other. The Tool Room may provide typical instances, although the rarity of the all-round mechanic lessens the probabilities of finding many cases anywhere. A compromise must be made to fit the circumstances, and this will usually mean treating the men in question as hand workers with more accessories, in the form of machines, than is usual. This is almost certain to be the right treatment in the Pattern Shop, though here the advent of pattern-making machines operated by a special man is resulting in the pattern-maker becoming purely a hand worker in the ordinary sense.

It may be safely assumed that in every department the producing units to be recognised in the allocation of departmental expenses can be resolved into either hand or machine sections.

Following from this, there will be many departments containing both kinds of producing units. Some basis must, therefore, be established for first dividing the total departmental expenses between

Apportionment of Departmental Expenses to Individual Producing Units.

the two sections before proceeding to deal with the individual units.

Some suggestions are given below as to the lines of division that may be followed.

Apportionment of Departmental Expenses between Hand and Machine Sections.

Building Service.	Divided on ratio of areas actually occupied.
Power Service.	All to Machine section subject to deduction for hand-workers' use of hand pneumatic, electric and hydraulic tools; also for transportation power consumption in the case of heavy hand work.
Producing Unit Service.	All to Machine section. The equivalent service for the Hand section is included in the Building Service apportionment. Special process plant expenses may affect either Hand or Machine sections and can only be dealt with on the merits of each case.
Tool Service.	Apportioned to the Hand section according to the Works Manager's estimate, but usually not exceeding the ratio of the number of hand units to machine units. The balance to go to the Machine section.
Material Service. **Departmental Service.** **Administration Service.** **Contingency Service.**	Divided according to ratio of total hand production hours to total machine production hours.

5-136. Having settled the total expenses to be borne by the respective sections in any department, the next step is to arrive at the average shop charge rate per hour that would allocate these expenses.

In some departments these average or flat rates per hour can be adopted with little hesitation for use as the proper shop charge rate for all the hand or all the machine units in the department.

In the matter of hand work, this will be the general case, except may-be for certain hand workers having exceptional accessories not in use by the others in the department.

With machine work, the average rate is really only permissible where the machines throughout the department are fairly uniform in character.

In any case it is only to this stage that the investigation of shop charge rates can economically be carried out each fortnight, nor are further statistics likely to be of much use for frequent comparison.

The difference for any period between the total shop charges applied to direct wages in any department, and the works expenses apportioned to the department may conveniently be expressed as a percentage of over- or under-allocation of expenses. Statistics in this form will guide the management as to the urgency of modifying the shop charge rates in use. Such modification is not, however, recommended at any but rare intervals as vitiating the comparisons of the figures for different periods.

Apportionment of Departmental Expenses to Individual Producing Units.

The completion of the stage under discussion resolves itself mainly into apportioning the machine section total expenses to the individual machine units and the hand section total expenses to the hand units. The procedure in both cases will be similar, though the machine units are more particularly considered in the following suggestions :

Apportionment of Departmental Expenses to Individual Producing Units.

Building Service.	By percentage based on ratio of net individual area occupied to total net areas occupied by producing units. Net areas should include the space required for working each machine. This plan automatically deals with non-producing areas by proportionately increasing the incidence on the producing areas.
Power Service.	By percentage based on the ratio of average power used by the individual unit to the average total power consumed in the department. This automatically spreads transmission losses in proportion to the net power used. To arrive at the average power used by individual machines specific tests may be necessary on representative machines. The belting capacity is rarely a safe guide to the power consumed.
Producing Unit Service.	By percentage based on capital value of individual items, subject to scrutiny of Works Manager—particularly in the case of Special Process Plant.
Tool Service.	By percentage based on Works Manager's estimate.
Material Service.	By same percentage as Producing Unit Service or, when the producing units are of uniform character, by sub-division, according to the number of such units.
Departmental Service.	Same basis as Material Service.
Administration Service.	By sub-division according to the number of producing units.
Contingency Service.	Same basis as Administration Service.

Application of Shop Charge Rates.

The fifth stage is to determine on what basis to apply the individual shop charge rates.

The period for which the expense figures are taken will contain a certain number of working hours, and the natural course to take is to divide the total expenses by the number of hours worked and so arrive at a shop charge rate per hour. The total expenses in question may be as apportioned to the department as a whole or as apportioned to the individual producing unit, thus giving either departmental rates or individual unit rates.

Having worked along these lines to arrive at the shop charge rates, it might seem unnecessary to offer any discussion of the method frequently adopted of applying shop charge rates as a percentage

Application of Shop Charge Rates.

on the workers' wages. As a matter of fact, such a practice is usually only condoned as being particularly easy, and the percentages used are hardly the outcome of any serious consideration of the real facts of the case.

For estimating purposes, a percentage on wages to cover works expenses is more excusable, as close discrimination is not usually possible at that stage, and the method is the one that the commercial man is trained to use, and he is dubious of any other.

There is nothing to prevent hourly shop charge rates being converted into a percentage of the worker's hourly wage, or in the case of departmental rates into a percentage of the departmental average hourly rate. This course is as good as any other for furnishing percentage figures to the Estimating Department.

One objection to a percentage-on-wages plan is that in the case of piecework the costs never decrease, according to the accounts, however much the time taken may be reduced. This result has helped to induce the feeling that with piecework the prices must be cut if any saving is to be effected, whereas, with the shop charges applied on the basis of time worked, the saving of time would be seen to correspondingly reduce the shop charges sufficiently to more than offset the increased payment to the workers per hour.

The following example will illustrate the point. The assumption is that the piece price is 1s. 4d. per piece, the man's time rate 8d. per hour, the shop charge rate 8d. per hour or 100 per cent. on wages.

Time taken per piece.	Time Wages.	Extra Pay or P. W. Balance.	Total Earnings per Hour.	Total Labour Cost.	Shop Charges at 100 per cent.	Total Cost (*a*).	Shop Charges at 8d. per hour.	Total Cost (*b*)
1½ hrs.	1/-	4d.	10⅔d.	1/4	1/4	2/8	1/-	2/4
1 hr.	8d.	8d.	1/4	1/4	1/4	2/8	8d.	2/-

If the pieceworkers were assumed to earn, on an average, time and a quarter, the calculation of percentage would be to set a shop charge rate of 8d. against an hourly earning of 8d. plus one quarter of 8d. = 10d., giving a percentage of 80 per cent. only. In this event the total costs, marked "a," would be in each case 2s. 4¾d., while the total costs "b" would work out as indicated.

This particular objection to the percentage-on-wages plan may be overcome by applying the percentage to the time wages only, though that routine begins to take away the vaunted simplicity of the percentage plan.

Another objection to the percentage method lies in its failure to

Application of Shop Charge Rates.

discriminate between the true cost of efficient and inefficient labour if the hourly rates of wages differ, as is likely to be the case.

A further illustration will emphasise the point, and to simplify it daywork is assumed, though otherwise the figures of the previous example apply.

Worker.	Hourly Wage Rate.	Time Taken per Piece.	Time Wages per Piece.	Shop Charges at 100 per cent.	Total Cost per Piece.	Shop Charges at 8d. per hour.	Total Cost per Piece.
Apprentice -	4d.	3 hrs.	1/-	1/-	2/-	2/-	3/-
Improver -	6d.	2½ hrs.	1/3	1/3	2/6	1/8	2/11
Mechanic -	8d.	2 hrs.	1/4	1/4	2/8	1/4	2/8

When regard is paid to the fact that the machine is in longer use by the cheaper workers, the fallacy of the percentage-on-wages plan will be evident—not to mention the loss of profit by the smaller output in a given time from the less skilled workers.

The argument of those who use the percentage-on-wages plan, is that for a given job the wages rates of different workers will not vary widely, that men will not be given boys' jobs and *vice versa.* This point rather fails if average percentage rates are used, for certainly cheap labour does not always operate cheap machines.

There is one condition of affairs that may render the percentage plan innocuous, and that is when contracts are large and costs are only considered in the bulk. In this case the total shop charges applied to each contract may, by the law of averages, approximate to the proper figure as closely by the use of percentages as of hourly rates, but there is no guarantee of this occurring for every contract. The same reasoning can alone justify the use of percentages on material and wages cost combined, considered from a costing point of view, although, for estimating, trade practice may make such a course convenient if risky.

Normal Works Expenses.

The sixth and concluding stage of enquiry is to determine to what extent average figures of works expenses shall be used for assessing the various departments.

Obviously if the object is to allocate to a nicety the actual expenses incurred, the proper rates to be used can only be known at the end of the period concerned. This involves delay and practically prohibits any discrimination in the rates that are applied.

An alternative to waiting is to estimate the expenses likely to be incurred under the conditions that will probably obtain during the period in question. This is obviously a difficult matter.

Normal Works Expenses.

An outstanding objection to both these courses is that the rates will fluctuate widely in periods of varying activity.

The proper course seems to be to base the shop charge rates on the expense figures that will obtain when the factory is working efficiently as regards the volume of output. Such expenses may be considered as the normal, and the shop charge rate based on same may also be termed normal.

These normal shop charge rates may be taken as the lowest that can be used with safety in estimating costs, and all orders obtained at a price that allows a sufficient margin for commercial expenses and profit over and above the works costs, including normal shop charges, should be profitable orders.

In practice it usually happens that the margin of gross profit fluctuates widely on different orders, and selling expenses can frequently be traced as being very irregular. The blend of business needs to be such as will ensure a satisfactory net profit at the end of each year. If care is taken not to accept business that does not cover the normal shop charges, except under circumstances acceptable and known to the management and the Directors, the blending of business may be undertaken with the likelihood of good results.

If the contention can be admitted that estimates of costs should always be prepared on normal lines as regards the provision for shop charges—whether the selling price bears any regular relation to the estimated costs or not—it will give much more value to the actual cost figures if the shop charges are applied at normal rates in the cost allocation accounts.

There is another and perhaps more important reason for using normal shop charge rates in the works accounts, and that is to set up some standard by which the departmental production may be compared.

If the shop charges as applied to the production of any department for a given period, amounts to a less total than the actual expenses apportioned to that department, it may be assumed that the volume of production is below the normal or accepted efficiency level.

The departmental inefficiency indicated in this way might have reference to an undue growth of expenses incurred within the department itself, or an undue growth of the works expenses generally, which consequently burdens the department beyond the point that the current production will carry.

In arriving at the normal works expenses for a normal output there should be a close examination of all the data available.

Opinions will differ as to what is to be considered the normal output for a given factory, and, while three-fourths of the factory's

Normal Works Expenses.

full capacity is suggested as a suitable standard, the decision must depend on local judgement.

The higher the proportion taken the greater the volume of production necessary to realise the normal conditions or efficiency level. On the other hand, the higher the assumed output efficiency level the lower will be the normal shop charges and the easier, presumably, to obtain the requisite volume of business.

A question that will arise from the use of normal shop charge rates is the balance of expenses not allocated by this means. Provision for this is made in connection with the Works Account Annual Abstract.

Calculations for Shop Charge Rates.

It will be quite obvious that the stages suggested for arriving at shop charge rates, either departmental or individual, will involve a number of calculations outside the range of ordinary ready reckoners.

The slide rule, as an alternative, is not a very satisfactory method of calculation in matters pertaining to accounts, if only that the practice that makes perfect is liable to be lacking. Logarithms are fairly rapid, easily learnt and sufficiently accurate. Mechanical means, on the other hand, of a kind suitable for percentage calculations are not of equal use in accounting work.

There are master tables published applicable for calculating percentages for expense apportionments and the like, and for making ready reckoners for applying percentages of frequent occurrence.

There is, therefore, no need to hold back from the proposed investigations on the score of expense or clerical trouble.

The hourly shop charge rates, after being worked out, can without serious injustice be rounded off to the nearest farthing and thus brought within the scope of the ordinary ready reckoner.

Process Charges.

In connection with certain departments, such as Iron Foundry, Brass Foundry and Smithy, it is better to allocate some expenses by what is termed a process charge, which is applied on the basis of the weight of output.

This reduces the total expenses to be dealt with by shop charge rates applied to the direct wages. The matter is discussed in detail under Process Products, Section IV 3.

Material Service Charges.

There are expenses in connection with materials which are obviously directly related to the bulk or weight in question, rather than to the initial cost or the amount of labour afterwards expended in working the material.

Material Service Charges.

Where this fact is considered worth special recognition, a Material Service Charge could be applied. This would mean excluding some or all of the expenses included under Material Service in arriving at shop charge rates.

In the system of cost allocation accounts offered, the material service charges would be applied on the material cost allocation sheets concerned, and summarised under the general heading of shop charges in the Cost Ledger.

There are difficulties in the way of checking the book-keeping accuracy of the initial entries, and, further, the departmental shop charge statistics become somewhat dislocated for comparative purposes.

These disadvantages may not be serious enough to make the use of material service charges undesirable, in some instances at least. A typical case is that of timber, to which exceptional expenses attach as regards cutting, drying, storage and wastage. The alternative that is sometimes adopted is to include these expenses in making up the shop charge rates on direct wages in the wood-working department.

Another way, which, under the present system, would be irregular, is to increase the price charged for the timber in the cost allocation accounts. This course could be made a regular one by transferring to *Works Materials Suspense Account* the amount added to the actual purchase costs for this purpose.

Another possible case for a material service charge is steel that has to be case-hardened, or for that matter any other species of heat treatment. The costs of case-hardening cannot be allocated satisfactorily by any ordinary method, yet it might be better to allocate by an arbitrary charge on the material rather than be forced to treat the costs as a works expense to be borne generally.

Perhaps the most important case to consider is that of factored goods which, under a system of applying shop charges to wages only, escape their proper charge in the works accounts for handling and storage.

Reference is necessary to a fairly common practice of applying a flat percentage charge to all materials on the basis of values. This is hardly a serious attempt at a material service charge, in the sense meant here, as obviously values are no index to the incidence of material service expenses.

Some firms use a percentage, as high as twenty, on the grounds that they are merchanting the material and should apply a merchant's commission. The obvious difference is that the merchant's commission is to cover selling expenses and profit, neither of which pertains to works costs.

Material Service Charges.

The use of flat percentage charges on material values is easy, and raises no doubt in the mind of the ordinary commercial man. Incidentally the practice disposes of a considerable proportion of works expenses, which the commercial man is ever ready to doubt when their ratio to direct labour is declared in its true light.

The adoption of such arbitrary methods in the works accounts will be hard to justify, and, when they are permitted, it is absurd to attempt any refinement in dealing with the remainder of the works expenses.

The practice no doubt arose from adding a percentage of profit to material costs in building up selling prices. While there should be a certain parallel between cost data and selling prices, it is not desirable to import into works accounting the purely arbitrary methods that are almost inevitable in fixing selling prices.

Interest Charges.

In considering shop charges the question arises as to how to deal with interest charges on capital invested in the buildings and plant.

From the financial account point of view, interest can only be met out of profits, or rather interest on capital constitutes profit.

To include an interest charge as an element of works expenses is, in a sense, to include an anticipated profit as an expense which is fundamentally unsound.

There is the other view that if the buildings and plant are rented the rent charged, and accepted as an expense, will include interest on the capital value involved. This interest is the landlord's profit, and the rent is the selling price of the services rendered.

While interest charges cannot be included in works expenses, some recognition of the capital values involved in any process is necessary, if the shop charges are to be equitable.

It is hardly in dealing with works expenses as a whole, or by departments, that the influence of interest demands consideration, but rather in fixing the shop charges rate for individual producing units.

Taking the instance of a machine of the capital value of £500, interest on that amount at 5 per cent. would be £25 per annum.

If the working hours are assumed as being 50 per week for 50 weeks in the year, in other words 2500 hours per annum, the interest charge per hour will work out at 2·4d. per hour.

Comparing this with another machine, value £50, the interest charge on the same basis would be only ·24d. per hour—a net difference of 2·16d. per hour for interest alone.

Now, in fixing the shop charge rates for individual producing units, if an interest charge is temporarily assumed, gross individual rates will be arrived at that will be in excess of the normal rates by

Interest Charges.

the same percentage as the gross expenses (net expenses plus the total interest charges assumed) exceed the net expenses. Thus, if the total capital value of machinery in a department is £5,000, the total interest charge at 5 per cent. will be £250 per annum. Supposing the net departmental expenses total to £6,250 per annum, then the gross expenses will be £6,500, or four per cent. in excess of the net expenses.

The recommendation is that the gross individual shop charge rates, which include the assumed interest charge appropriate to each, shall be reduced to net rates by a flat percentage deduction—in the present illustration of four per cent.

Continuing the illustration, if the gross shop charge rate for the £500 machine worked out to be 1s. per hour and for the £50 machine 9d. per hour, the net rates would be 4 per cent. less, viz. 11·52d. (say 11½d.) and 8·64d. (say 8¾d.) respectively.

The ratio of the two rates remains unaltered, viz. 4 : 3, and the more expensive machine is adequately penalised without the sum total of shop charges, as applied by the net rates, being in excess of the net works expenses, as recognised in the financial accounts.

Shop Charges Book.

Consideration must now be given to the accounting necessary in connection with shop charges.

By means of a Works Cost Allocation Abstract the works expenses for each account period are reported to the Financial Department, and on the same abstract is given the shop charges as applied to the various orders series.

As regards grand totals the financial accounts can be completed in respect to works expenses incurred and works expenses allocated to orders without further information from the Works Accounts Office.

It is necessary, however, for handling the shop charges properly to have as part of the works accounting system a Shop Charges Book in which are recorded the details of the works expenses, their apportionment to departments for calculating shop charge rates, and the results of applying those rates.

5·134. In the following tabulation of the accounts in the Shop Charges Book, appropriate to the system of works accounts under discussion, it will be noted that most of the entries necessary are indicated as being memorandum entries. This arises from the fact that these accounts are not directly interlocked with the financial accounts. It will, all the same, be readily appreciated that only through such means as these can the allocation of works expenses to orders be carried out with any certain efficiency and accuracy.

Shop Charges Book.

Shop Charges Book—Tabulation of Accounts.

S.C.Bk. REFERS TO SHOP CHARGES BOOK.

Building Service Account.

DR.	CR.
Memorandum entries of costs from Cost Ledger * (Standing Orders). Transfers from Annual Depreciation Accounts (S.C.Book).	Transfers to Departmental Expense or Departmental Process Summary Accounts (S.C.Bk.) as per Works Expenses Apportionment Report.†

Power Service Account.

Memorandum entries of costs from Cost Ledger (Standing Orders). Transfers from Annual Depreciation Accounts (S.C.Bk.).	Transfers to Departmental Expenses or Departmental Process Summary Accounts (S.C.Bk.), as per Works Expenses Apportionment Report.

Producing Unit Service Account.

Memorandum entries of cost from Cost Ledger (Standing Orders). Transfers from Annual Depreciation Accounts (S.C.Bk.).	Transfers to Departmental Expense or Departmental Process Summary Accounts (S.C.Bk.), as per Works Expenses Apportionment Report.

Tool Service Account.

Memorandum entries of costs from Cost Ledger (Standing Orders). Transfers from— Drawings and Patterns Stock Account (S.C.Bk.). Jigs and Special Tools Stock Account (S.C.Bk.). Loose Plant Stock Account (S.C.Bk.), representing annual loss disclosed at stocktaking or amounts written off.	Transfers to Departmental Expense or Departmental Process Summary Accounts (S.C.Bk.), as per Works Expenses Apportionment Report.

Material Service Account.

Memorandum entries of costs from Cost Ledger (Standing Orders).	Transfers to Departmental Expense or Departmental Process Summary Accounts (S.C.Bk.), as per Works Expenses Apportionment Report.

Departmental Service Account.

Memorandum entries of costs from Cost Ledger (Standing Orders).	Transfers to Departmental Expense Summary Accounts (S.C.Bk.), as per Works Expenses Apportionment Report.

In the case of departments for which process accounts are kept, such as Iron Foundry, Brass Foundry and Smithy, the expenses falling under the heading of Departmental Service are better charged direct to the respective process cost account.

Administration Service Account.

Memorandum entries of costs from Cost Ledger (Standing Orders). Transfer from Office Equipment (Works) Stock Account (S.C.Bk.), representing annual loss disclosed at stocktaking or amounts written off.	Transfers to Departmental Expense or Departmental Process Summary Accounts (S.C.Bk.), as per Works Expenses Apportionment Report.

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* See Section V m—Form 5-132.

† See Section V m—Form 5-136.

Shop Charges Book.

Shop Charges Book—Tabulation of Accounts, contd.

S.C.Bk. REFERS TO SHOP CHARGES BOOK.

Contingency Service Account.

Dr.	Cr.
Transfer from Guarantee Account (S.C.Bk.) representing estimated guarantee liabilities on preceding year's output, as to replacement of defective parts within, say, one year of sale. Transfer from Development and Experimental Account (S.C.Bk.) representing anticipated expenditure to be written off for the year. Memorandum entry of annual deduction from general stock inventory to cover bad and doubtful stock, as per Works Accounts Annual Abstract.*	Transfers to Departmental Expense or Departmental Process Summary Accounts (S.C.Bk.), as per Works Expenses Apportionment Report.

Departmental Expense Summary Account.

Transfers from— Building Service Account (S.C.Bk). Power Service Account ,, Producing Unit Service Account ,, Tool Service Account ,, Material Service Account ,, Departmental Service Account ,, Administration Service Account ,, Contingency Service Account ,, Transfer from— Extra Depreciation Account (S.C.Bk.).	Memorandum entries of Departmental Shop Charge Totals, as per Wages Allocation Summary.† Balance, if any, transferred to Shop Charges Supplementary Account (S.C.Bk.)

Separate summary accounts will be necessary for each department except those for which a process summary account is provided.

Annual Depreciation Account.

Memorandum entry of depreciation for year in conformity with the financial accounts.	Transfers to— Building Service Account (S.C.Bk.) Power Service Account ,, Producing Unit Service Account ,,

Separate accounts will be necessary under the following heads :

Land and Buildings.
Motive Power Plant.
Mechanical Transmission.
Electrical Transmission.
Pipe Transmission.
Transportation Plant.
Shop Fixtures.
Special Process Plant.
Machines.

In the case of leasehold property, provision for the expiration of the lease needs to be included as an annual charge dependent on the conditions and further duration of the lease.

Extra Depreciation Account.

Memorandum entries of extra depreciation on discarded plant items, representing difference between book or capital value and realisable value of such plant. The entries should be made at same time as Works Additions Accounts are credited with realisable values.	Transfers to— Departmental Expense Summary Account (S.C.Bk.). Departmental Process Summary Account (S.C.Bk.).

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* See Section VI f—Form 6-45.

† See Section V b—Form 5-30.

Shop Charges Book.

Shop Charges Book—Tabulation of Accounts, contd.

S.C.Bk. REFERS TO SHOP CHARGES BOOK.

It may be necessary to have separate accounts for each department to facilitate the transfers crediting this account.

Analysis under the various plant headings (see Annual Depreciation Account above) will be necessary for the purposes of the Works Account Annual Abstract. This is likely to be sufficiently simple a matter to require no separate sub-division of this account.

Departmental Capital Values Account.

Dr.	Cr.
Memorandum entry of capital value at beginning of year of buildings and plant appropriated to department's use. This may have to be based on a Works valuation, but the sum total of capital values in all departments must agree with the financial accounts. Memorandum entries of Works Additions Costs, as per Plant Sub-Orders Cost Summary,* from which the totals appearing on the Works Cost Allocation Abstract are derived.	Memorandum entry of annual depreciation on department's buildings and plant. The sum total of depreciation for all departments must agree with the financial accounts totals. The same totals appear in the Annual Depreciation Account (S.C.Bk.) divided under the headings adopted in the financial accounts. Memorandum entries of extra depreciation corresponding with the totals figuring in the Extra Depreciation Account (S.C.Bk.). Memorandum entry of capital value at end of year of department's building and plant.

Separate accounts are necessary for each department, and in each case provision should be made for dissecting the entries under the headings of plant, adopted in the financial accounts.

Discarded Plant Stock Account.

Memorandum entry of stock values brought forward at beginning of year, in conformity with the financial accounts. Memorandum entries of stock values of unsold discarded plant from Cost Ledger (Standing Order). These stock values will be reduced by credits in respect to disposal of plant.	Memorandum entry of stock values carried forward at end of year as per Works Accounts Annual Abstract. Balance, if any, transferred to Shop Charges Supplementary Account (S.C.Bk.).

Drawings and Patterns Stock Account.

Memorandum entry of values brought forward at beginning of year, in conformity with the financial accounts. Memorandum entries of costs of additions from Cost Ledger (Standing Order).	Memorandum entry of values carried forward at end of year, as per Works Accounts Annual Abstract. Balance, if any, representing loss in value disclosed at stocktaking or amount written off for the year, transferred to Tool Service Account (S.C.Bk.).

Jigs and Special Tools Stock Account.

Memorandum entry of values brought forward at beginning of year, in conformity with the financial accounts. Memorandum entries of costs of additions from Cost Ledger (Standing Order).	Memorandum entry of values carried forward at end of year, as per Works Account Annual Abstract. Balance, if any, representing loss disclosed at stocktaking, or amount written off for the year, transferred to Tool Service Account (S.C.Bk.).

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* See Section V m—Form 5-137.

Shop Charges Book.

Shop Charges Book—Tabulation of Accounts, contd.

S.C.Bk. REFERS TO SHOP CHARGES BOOK.

Loose Plant Stock Account.

DR.	CR.
Memorandum entry of values brought forward at beginning of year, in conformity with the financial accounts. Memorandum entries of costs of additions from Cost Ledger (Standing Order).	Memorandum entry of values carried forward at end of year, as per Works Accounts Annual Abstract. Balance, if any, representing loss disclosed at Stocktaking or amount written off for the year, transferred to Tool Service Account (S.C.Bk.)

Office Equipment (Works) Stock Account.

Memorandum entry of values brought forward at beginning of year, in conformity with the financial accounts. Memorandum entries of costs of additions from Cost Ledger (Standing Order).	Memorandum entry of values carried forward at end of year, as per Works Accounts Annual Abstract. Balance, if any, representing loss disclosed at stocktaking, or amount written off for the year, transferred to Administration Service Account (S.C.Bk.).

Scrap Stock Account.

Memorandum entries of total scrap stock values for each account period from Cost Ledger (Standing Order).	Memorandum entries of total scrap stock additions for each account period, as entered in Works Expenditure Book (Stock Product Summary).*

This account is provided merely to agree the totals indicated above.

The totals of scrap stock values appearing under Standing Order U 2-1, are the basis of reports on the Works Products Abstracts † whereby the *Works Material Suspense Account* in the financial accounts is debited.

Sales Returns Stock Account.

	Memorandum entries of stock value of total sales returns for each account period, as entered in Works Expenditure Book.

This account is of limited usefulness as it cannot very well be balanced.

When goods are returned from sale there is not usually any Works Account affected, and the only provision to make is for the general stock to be debited at a proper figure for the accession to stock. This is done through the periodical Works Product Abstract, which includes the total Works value of items specially recorded in the Works Expenditure Book as saleable goods received back into stock.

Departmental Process Metal Accounts.

Memorandum entry of metal values of work-in-progress brought forward at beginning of year, in conformity with the financial accounts. Memorandum entries of metal costs from Cost Ledger (Standing Orders).	Memorandum entries of metal charges as per Works Expenditure Book (Process Product Summary).‡ Memorandum entries of costs of ascertained metal losses from Cost Ledger (Standing Order). Memorandum entry of metal values of work-in-progress carried forward at end of year, as per Works Accounts Annual Abstract. Balance, if any, transferred to Departmental Process Summary Account (S.C.Bk.).

* See Section V m—Form 5-119.

† See Section VI f—Form 6-44.

‡ See Section V m—Form 5-118.

Shop Charges Book—Tabulation of Accounts, contd.

Shop Charges Book.

S.C.Bk. REFERS TO SHOP CHARGES BOOK.

Departmental Process Summary Account.

DR.	CR.
Memorandum entry of work-in-progress inventory values (less metal values) brought forward at beginning of year, in conformity with the financial accounts.	Memorandum entry of works value (less metal charges) of process product, as per Works Expenditure Book (Process Product Summary).
Memorandum entries of process costs from Cost Ledger (Standing Orders).	Memorandum entry of work-in-progress inventory values (less metal values) carried forward at end of year, as per Works Accounts Annual Abstract.
Transfers from— Building Service Account (S.C.Bk.). Power Service Account ,, Producing Unit Service Account ,, Tool Service Account ,, Material Service Account ,, Administration Service Account ,, Contingency Service Account ,,	Balance, if any, transferred to Shop Charges Supplementary Account (S.C.Bk.).
Transfer from— Extra Depreciation Account (S.C.Bk.)	
Transfer from— Departmental Process Metal Account (S.C.Bk.).	

Separate accounts will be necessary for each department to which process accounts apply.

Stock Manufacturing Differences Account.

Memorandum entries of undercharges on stock product, as noted in Cost Ledger (Stock Manufacturing Orders).	Memorandum entries of overcharges on stock product, as noted in Cost Ledger (Stock Manufacturing Orders).
	Difference, or balance, if any, transferred to Shop Charges Supplementary Account (S.C.Bk.).

Guarantee Account.

Memorandum entries of Guarantee Order costs, as per Delivered Orders Cost Abstract.*	Transfer to Contingency Service Account (S.C.Bk.) of estimated guarantee liabilities on preceding year's output, as deducted from work-in-progress inventory value at end of year.

This account cannot very well be balanced, as the difference on the account is not one that can be recognised in either the Works accounts or the financial accounts.

In the financial accounts guarantee costs do not figure as an expense but merely reduce the gross profits.

The above account is desirable as a record to guide the Management in the estimation of prospective liabilities.

Development and Experimental Account.

Memorandum entry of values brought forward at beginning of year, in conformity with the financial accounts.	Transfer to Contingency Service Account (S.C.Bk.) of anticipated expenditure to be written off for the year.
Memorandum entries of development and experimental costs during year, as per Works Cost Allocation Abstracts.	Memorandum entry of values carried forward at end of year, as per Works Accounts Annual Abstract.
	Balance, if any, transferred to Shop Charges Supplementary Account (S.C.Bk.).

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* See Section V m—Form 5-138.

Shop Charges Book.

Shop Charges Book—Tabulation of Accounts, contd.

S.C.BK. REFERS TO SHOP CHARGES BOOK.

Expenditure Suspense Account.

DR.	CR.
Memorandum entry of expense payments in advance brought forward at beginning of year, in conformity with the financial accounts.	Memorandum entry of expense liabilities (not charged) brought forward at beginning of year, in conformity with the financial accounts.
Memorandum entries of total suspense debits each account period, from Cost Ledger (Standing Order).	Memorandum entries of total suspense credits or transfers to other accounts, from Cost Ledger (Standing Order).
Memorandum entry of expense liabilities (not charged) carried forward at end of year, as per Works Accounts Annual Abstract.	Memorandum entry of expense payments, in respect to following year, carried forward at end of year, as per Works Accounts Annual Abstract.

This account is occasioned by the desirability of holding long period payments, such as insurance, in suspense and consequent necessity to transfer appropriate amounts to particular expense accounts each account period. There will be other cases, such as rent, where the position is reversed and the expenditure has to be anticipated to complete the current expense accounts.

If the Company carry their own risk as to workmen's accident compensation, instead of insuring, a separate suspense account will be necessary.

Shop Charges Supplementary Account.

Transfers from Departmental Expense Summary Accounts (S.C.Bk.) in respect to balances of expenses not allocated or distributed by the normal shop charges.	Memorandum entry of supplementary allocation of Works expenses, requisite to balance this account at end of year, as reported in the Works Accounts Annual Abstract. In this supplementary allocation the total in question will be divided between Sales Orders, Sales Repairs and Sundries Orders, Process and Stock Manufacturing Accounts, in the same ratio as the total shop charges already applied for the year in each division.
Transfer from Discarded Plant Stock Account (S.C.Bk.) in respect of balance of unsold discarded plant debited to stock and not otherwise disposed of by the accounts.	
Transfer from Departmental Process Summary Accounts (S.C.Bk.) in respect to balance of. costs in excess of the total Works value of product.	
Transfer from Stock Manufacturing Differences Account (S.C.Bk.), in respect to balance of costs in excess of the total Works value of product.	
Transfer from Development and Experimental Account (S.C.Bk.) in respect to balance of costs to be written off over and above provision made at beginning of year.	
Memorandum entry of shop charges written back on Works Additions from Plant Sub-Order Cost Summary, and on ExperimentalOrders from Cost Ledger (Standing Order).	

Section IV g

Process Product.

Meaning of Process Product.

PROCESS product is, as its name states, the product of a process. A process may be conveniently described as a cycle of operations, though it is quite often used to describe a class of operation. By taking the former definition of process as a cycle of operations and qualifying it as meaning the whole cycle of operations pertaining to one department, a definition suited to the present purpose is obtained. Thus a casting is held to be a process product in the sense that it is the outcome of the whole cycle of operations in the Foundry. A forging is another example, while stampings may be considered with forgings as being a type of machine-made forgings.

Meaning of Process Product.

Coppersmith's work is sometimes treated as process product. Case-hardening, galvanising and electro-plating are also processes within the meaning intended here.

It is intended to discuss in detail only the accounting and allied routine in connection with castings and forgings. Coppersmith's work may be dealt with on the same lines as forgings. Galvanised and plated work are analogous to brass foundry castings, though the basis of weight is likely to be very unsatisfactory.

Galvanising more usually has reference to heavy articles, and it may not be too difficult to discriminate between different classes of work by timing the operations of pickling and dipping.

In considering the process of plating, the operations of polishing that precede the plating and of mopping that follow it, require to be included, rather than be faced with the alternative of booking this time to the different orders. When piecework applies to any of these operations, it will be a simple matter to allocate the wages accordingly. The variety of work may very well be compared with the case of brass castings. A weight basis is hardly likely to be even considered for plated work, and the solution may be possibly found by expressing each variety of plated work in terms of some staple line—giving virtually a common denominator. After doing that it is a simple matter to divide the total cost for a given period by the number of units of product, as arrived at in the way suggested.

Turning to case-hardened work, there may be businesses where it will be feasible to treat this on the lines discussed for plated work, but more often than not, case-hardening costs will have to be treated as an expense item. The resulting errors in the individual component costs may be remedied in making up component selling prices by an estimated allowance for case-hardening. The difficulty is to know on what basis to estimate. Probably the best way is to calculate how many of a certain line of articles could be handled in, say, a fortnight, and to then divide the whole normal costs for a fortnight by this figure. If this is tried out for a few typical lines, enough data may be available to quite nearly enough estimate for all sorts of articles.

Process Cost Accounts.

The routine of arriving at the charges to be made for the individual

Process Cost Accounts.

items of process product may conveniently be referred to as pricing the process product. Theoretically the prices used should be such that the total of the process product charges will correspond with the total costs under the process account.

The data requisite for properly pricing process product necessarily influences the form of the process cost account itself.

Taking the case of the Brass Foundry where, in most cases, an average price per lb. according to the alloy, is all that can very well be attempted, with, perhaps, a grading of the average price up or down to cover intricate castings and plain castings, it is obvious that comparatively little dissection is required in such a process cost account.

In the case of the Iron Foundry and Smithy, on the other hand, the direct wages element in the process cost is so important, and is so individual in character, having no sort of reference to the weight of product, that provision must be made for differentiating the application of these costs from those that need to be averaged. Then again, there are shop charges attaching to this direct labour per hour, as in the case of direct labour in other departments.

The producing units in the Iron Foundry will be moulding machines, with their relatively heavy upkeep, as well as moulders. Coremaking expenses are related to the time occupied in making the cores, though not, perhaps, with any marked regularity, but certainly with more consistency than a weight basis would give.

In the Smithy there may be presses and hammers which it is most necessary to treat as producing units and to apply suitable shop charges for each hour in use.

There are, however, departmental costs in connection with casting and forging processes that are more consistently related to the weight of the product than to the direct labour involved in preparing cores or moulds or forming the forging. The heating, fettling, pickling, and annealing, general labouring and carting operations are the outstanding items of this character, though, of course, fettling does not occur in the case of forgings, though pickling and annealing commonly does. Shop supplies, especially in the Foundry, follow the weight of product basis approximately. Taking the departmental service expenses, as previously defined when dealing with the shop charges, the only items of any consequence that can hardly be said to be directly related to the weight of product are overtime expenses, shop supervision and inspection. As to the latter combined item, inspection in these cases is as fairly allocated on a weight basis as on a direct labour basis. If all these items are dealt with on a weight basis, the influence on the product price of the error incidental to applying overtime and supervision

Process Cost Accounts.

expenses on these lines instead of on a direct labour basis, will be negligible.

There is another element in process costs that has to be catered for in all three departments under consideration, namely, that of metals used.

In the case of the Foundries there will be metal losses in smelting, pouring and fettling that may be considered with sufficient accuracy as a definite percentage of the weight of the product, and, therefore, can be included with those costs which are applied on a weight basis.

In the Smithy the metal loss varies according to the type of forging, and can only be properly met by charging the gross weight of metal to the particular item of product. As it will be necessary to estimate the loss in many cases, there will probably be a certain proportion of metal loss to be treated with the expenses and allocated according to weight of product.

The departmental process cost accounts require therefore to have two main divisions, firstly as to metal cost, and secondly as to what may be termed process general costs. The latter includes departmental service expenses, direct labour, and the departmental apportionment of works expenses.

Although fettling is direct labour, it is not suggested that any attempt should be made to record the time spent on each order, and consequently the cost of fettling is included with the departmental service expenses for distribution on a weight basis, although a grading of the fettling charge per unit of weight on different classes of work would be fully justified, apart from the accounting trouble. The same might be said of pouring, particularly as to the smaller castings.

The cost of defective product can very well be added to departmental service expenses to be distributed by means of what are called process charges (applied on basis of weight of product), in contradistinction to shop charges as applied to direct labour.

Certain classes of castings are extremely liable to defect, *e.g.* cylinders to withstand pressure and slides which must machine to a perfectly clean face. Where these figure largely the rates charged for the castings ought to recognise these facts, rather than that the cost should be spread over all the other product equally. 5-127.

There will be cases of new designs (*e.g.* cylinders) where many wasters may be produced before the process is properly adjusted. This might be an instance where the costs of the defective work should be charged to developments and experiments.

Standing Orders for Process Cost Accounts.

The points that have been made above can be tabulated with advantage in conjunction with the suggested series of standing orders for process costs.

Standing Orders for Process Cost Accounts.

Representative Standing Orders for Process Cost Accounts (Castings and Forgings).

		Standing Order No.		
		Iron. Foundry.	Brass Foundry.	Smithy.
Process Metal Costs.	*Elements of Metal Charge.*			
	Metals. - - - - Various points in this connection are discussed further on. Ascertained Metal Losses are credited to this account and debited to Metal Loss below.	G 1-1	H 1-1	K 1-1
Process General Costs.	*Elements of Process Charge.*			
	Fuel - - - - -	G 2-1	H 2-1	K 2-1
	Shop Supplies - - - Arrangements for recording the consumption of these items also discussed further on.	G 2-2	H 2-2	K 2-2
	Overtime Expenses - - The remarks against Standing Order S 6-3 apply here equally.	G 2-3	H 2-3	K 2-3
	General Labour - - - This will include the cupola man, craneman and general labouring.	G 2-4	H 2-4	K 2-4
	Staff - - - - - This will include foremen, inspectors (if any) and clerks.	G 2-5	H 2-5	K 2-5
	Cartage - - - - This may cover the cost of carting the raw metal as well as the process product.	G 2-6	H 2-6	K 2-6
	Fettling, Pickling, and Annealing This account will cover the wages cost of the operations named. The cost of power for pneumatic chisels will probably only be conveniently apportioned to the department in dealing with Works Expenses—Power Service.	G 3-1	H 3-1	K 3-1
	General Preparations - - This order is provided to deal with cores, core irons, etc., made in advance and not for any particular order.	G 3-2	H 4-2	—
	Defective Product - - - Wasters that have not been charged out as process product and have not left the Foundry or Smithy will be charged instead to this account. No metal charge will be made except possibly in the case of the Brass Foundry. Wasters discovered after being charged out will be debited in full here, and the original order credited. In case of Brass Foundry product the metal depreciation will be charged here and the scrap value of the metal itself to scrap stock account (General Stock). For Iron Foundry and Smithy product the scrap value of the metal will be charged to the Process Metal Cost Account, if the waster is sent into the Iron Foundry or Smithy. The cost of breaking up defective castings may be included here.	G 4-1	H 4-1	K 4-1

Representative Standing Orders for Process Cost Accounts (Castings and Forgings).

Standing Orders for Process Cost Accounts.

		Standing Order Nos.		
		Iron Foundry.	Brass Foundry.	Smithy.
Process General Costs.	*Elements of Process Charge.* Ascertained Metal Losses - - The items under this account will be transfers from the process metal cost accounts G 1-1, H 1-1, K 1-1, and will be based on the periodical investigations.	G 4-2	H 4-2	K 4-2
	Elements of Direct Wages Charge. Direct Wages - - - This account records the direct wages, including extra pay, expended in the department. In the case of the Iron Foundry and Smithy, the items of direct wages pertaining to the individual orders will be noted on the Foundry Daily Work Sheets (5-73) and the Smithy Daily Work Sheets (5-78), and the total of such entries should agree with this account. In the case of the Brass Foundry, the direct wages charges are merged in the Process Charge for pricing purposes.	G 5-1	H 5-1	K 5-1
	Elements of Shop Charges on Direct Labour. Departmental apportionment of Works Expenses, - - - Building Service. Power Service. Producing Unit Service. Tool Service. Material Service. Administration Service Contingency Service. This apportionment is made in the Shop Charges Book against the departments under consideration in common with all other departments, except as to Departmental Service Expenses which are already debited to the process cost account under other headings. Shop charge rates intended to cover these expenses are applied to the Foundry and Smithy direct labour as a stage in building up the total value of the product for each period for inclusion on the Works Product Abstract. 6-44. It will be obvious that, in the financial accounts, the proportion of Works expenses thus included in the process cost accounts must be duly transferred from *Works Expenses Allocation Account* to *Iron Foundry Account*, *Brass Foundry Account* or *Smithy Account*, as may be appropriate. For this purpose, the apportionment referred to is included on the Works Cost Allocation Abstract 6-43. under the heading of Shop Charges.	—	—	—

Standing Orders for Process Cost Accounts.

Departmental Process Metal Accounts and Process General Accounts are provided in the Shop Charges Book, showing on the one side the total costs and on the other the total charges made for the product. Any differences disclosed after allowing for work-in-progress are transferred to a Shop Charges Differences Account to be specially allocated at the end of the year.

Iron Foundry Metal Costs.

The metal costs for the Iron Foundry involve three main considerations, firstly, the issue of the various brands of pig iron from stock, secondly, the use of scrap produced within the Foundry, and thirdly, the price of metal to be charged to the product.

The stock of pig iron is not susceptible to the control of lock and key, and the question of correct records of pig issued is really subsidiary to that of the correctness of the mixture used in the cupola, and obviously the larger problem will include the less.

The question of Foundry mixtures may not be the whole art of founding, but it is at least the side where failure to keep incessant watch will lead to failure of product or increased machining cost, that no moulding or pouring skill can avert.

To specify a mixture to-day that will produce a desired result assumes conditions of uniformity in the brands specified and the scrap used which to-morrow may not hold good in one or other particular, with a consequently different result. Any day may, therefore, bring different instructions to the cupola man as to how he must make up his charges for a particular class of mixture, perhaps nominally known as mixtures A. B. C. D. etc., for particular purposes, so as not to clash with pig iron grade numbers.

Without going too much outside the province of this section, it is
5·74. convenient to emphasise the necessity of a Foundry Mixture Card being issued on proper authority to instruct the cupola man as to the quantities of specified brands and scrap to be used for the mixture in question. Each instruction will stand until superseded by a later one under the same mixture reference.

While it is likely to be a profitable investment to have a chemist, with laboratory equipment, to issue these instructions and be responsible for the maintenance of chemical analysis, it is just as desirable to adopt the practice of written instructions of this character when the foundry foreman is responsible. With the aid of the mechanical analysis originated by W. J. Keep of Detroit, Michigan, U.S.A., the foundry foreman can exercise a high degree of judgment, particularly if the Management arrange for periodical chemical analyses to establish reference data.

A daily check of castings on these lines should establish such discipline in the cupola attendant's duties that accurate records of

Iron Foundry Metal Costs.

stock iron used will be available. The cupola attendant has only to chalk down the number of charges each day of each mixture and the foundry clerk can quickly convert the information into totals used of various brands and scrap. Incidentally stock control sheets for all pig iron can be kept up each day, thus avoiding unconsciously running low in the stock of particular brands. This risk is very real with any considerable number of brands in use, and the best practice favours the use of many brands.

The second point to deal with is that relating to the scrap made within the iron foundry. Of the total iron melted each day a heavy proportion, sometimes 25 per cent. or even more, remains behind in the foundry in the form of runners, risers, etc., and this scrap is used in specified proportions in succeeding melts or blows. The differences between the weight of iron melted and castings produced is to an appreciable extent irrecoverable.

All the metal passing to the cupola having been allocated to the Iron Foundry Process Cost Account the scrap remaining in the foundry is virtually floating scrap or work in progress which must not be redebited unless previously credited.

Occasionally scrap is bought outside, and there will be in most works a certain weight of scrap castings returned from the Machining and other departments weekly, if not daily. Obviously, the value of this external scrap must be debited to the foundry cost account ultimately, and if put into stock some confusion may arise between it and the floating scrap in the foundry. Instead of attempting to credit the foundry with the scrap made, which is a wasting quantity, and redebiting the scrap used, the simpler course is to hold none in stock, in the account sense, and to, therefore, allocate at once external scrap to the process cost account, increasing the floating scrap value accordingly.

On the stock control sheets the scrap stock will be added to each day by the difference between the previous day's melt and the net weight of castings sent into Stores, together with any item of external scrap. From this total the amount reported as used each day will be deducted. The scrap stock records will be kept in such grades as can be conveniently maintained. The balance of stock will require adjustment by reason of the irrecoverable metal loss occurring in the course of the foundry operations. To actually ascertain this loss involves taking stock of the scrap, and this can hardly be done frequently. As an alternative the scrap can be collected and the weight approximated with sufficient nearness to allow a safe figure to be stated of the ascertained loss. It is this figure that will form the basis of the adjustment necessary between the Metals Account (G 1-1) and Ascertained Metal Losses Account (G 4-2).

Iron Foundry Metal Costs.

A record of the metal costs is provided in the Shop Charges Book 5-134. that will show the book value of the floating balance of metal in the foundry at the end of each account period. The relation of the book value to the true value will depend partly on the accuracy of the metal loss adjustment and partly on the prices used in connection with the metal charges for the castings made, which is the third point to be dealt with here.

The prices used for the foundry mixtures must necessarily be in the nature of average prices based on the purchase price of the pig irons used and the proportionate value of the scrap metal used. It is, perhaps, hardly necessary to remark that scrap cast iron is in no sense an undesirable factor in foundry mixtures, but is an essential in the best mixtures within specified limits and of specified kinds.

As each consignment of pig iron is better stacked by itself on account of analysis questions that may arise, it is not difficult to indicate when a particular consignment is first broken on the Foundry 5-76. Weekly Report which the foundry clerk should furnish each week to the Works Accounts Office. This will be of use for checking the Stock Ledger Accounts for the respective brands and will indicate the purchase price to be used.

Under the arrangement suggested for scrap metal, pricing of scrap will only be necessary for account purposes in arriving at the metal rate to be used for the different foundry mixtures during each account period. Current market prices of new metal may influence the scrap price adopted, but it will be nearer to actual cost if the scrap prices follow the purchase prices of the brands of pig iron in use. Generally speaking, market prices apart from purchase prices should not disturb the price used in works accounts, except at the yearly valuation of stock, when the prices used must not exceed the current market price.

It will be obvious that the metal rate can easily be fixed so as to show a profit or gain on the metal account, but the aim should be to adhere to the purchase costs as closely as possible, leaving profits to the sales of the complete product into which the castings have entered.

Brass Foundry Metal Costs.

The foregoing remarks relative to the Iron Foundry Metal Account apply to a large extent to the Brass Foundry Metal Account except, of course, as regards the cupola chargings. The metals for the Brass Foundry are advisedly kept under lock and key by the General Stores and dealt out daily in the specified quantities as stated by the 5-86. Foundry Foreman on Goods Issue Vouchers. Sometimes the crucible charges are made ready in the Stores. In any case, the margin of new metal in the charge of the shop should be small and be properly taken care of.

Brass Foundry Metal Costs.

The floating scrap will have a high value in proportion to its bulk, and considerable precautions are necessary to prevent unnecessary waste or loss. It is desirable that the metal in the Brass Foundry should be balanced daily to ascertain the loss. With adequate shop management and its resulting discipline, a fortnightly balancing might be sufficient, provided only that the weighing up of scrap and unfinished castings is done with considerable care and no estimating allowed except for the dross on dirty scrap. It is desirable that a representative from the Works Account Office should be present at the stocktaking to take the official record, but not as implying any reflection on the foreman. From this information the percentage of metal loss can be ascertained.

Swarf, or cuttings, when sent loose to the brass foundry is apt to upset the percentage of metal loss, unless the quantity sent in each period is fairly even. In that case, the conditions being equal, comparison between the percentages each fortnight will not be unfair to the foundry, and this plan can apply even when swarf is run down into ingots and sent back into Stores. Loose swarf will, however, fetch higher prices in the market than ingot scrap, and care exercised in its collection, together with cleaning by magnetic separators, will be found very profitable. For own foundry use it is better to cast the swarf into ingots suitably marked.

In formulating the metal charge rates to be used for the Brass Foundry castings, it will be necessary to distinguish between those mixtures in which the use of scrap is permissible and those in which only new metal may be used.

The Management will, presumably, give clear instructions to the foundry foreman as to mixture limits, and these should be known to the Works Accountant, if not to his staff. The metal charge rates should be computed in accordance with these instructions.

Smithy Metal Costs.

In the Smithy the question of metal costs is not influenced by scrap in the way that occurs in the foundry. Scrap is produced in the operations of forging and stamping, but is not usually rehabilitated in the ordinary smithy. In the larger smithies the scrap may be reformed into billets or shingled, and for the present purpose it may be assumed that such billets would be made for stock and issued as billets for forging purposes later. If the forging operation follows immediately after the shingling operation the shingling cost might still be charged to a separate order.

There will be metal losses by scaling and in small chips that can hardly be considered as scrap. The scrap that is saleable may realise very good prices, but it will be convenient, and not seriously

Smithy Metal Costs.

unjust, to consider this scrap as a metal loss from the point of view of the metal account. The amount realised by any such sales can be credited to the standing order for metal loss (K 4-2).

It will be appreciated that metal losses have little relation to the weight of the forging produced, so that the metal loss cannot quite equitably be dealt with by the average percentage addition to the net weight of each forging. On the other hand, the errors of such a method may be considered too insignificant under some conditions to outweigh the advantage of its simplicity. The best alternative seems to be for the smithy foreman to estimate the metal loss in each instance, at the worst, by percentage formulas proved by careful test to be appropriate for each type of forging.

Assuming the metal loss to have been estimated with accuracy (presumably by deducting the net weight of forging from the gross weight of the bar with due allowance for useful surplus) it will be necessary to know what size and kind of bar has been used and whether hammered or rolled, to arrive at the proper metal charge.

Where bars or billets are bought specially for any order it is certainly necessary to allocate the cost of same to that order, and this may be achieved by making the metal charge rate for the forgings in question to correspond, always supposing that the process metal account is charged with the bar or billet in the first instance. There may also be questions of quantity used, the margin allowed, perhaps, proving excessive, although the sizes of billet or bar to produce a given forging are usually estimated very closely by an experienced foreman.

Taking one thing with another, it is likely to be worth while to have the foreman indicate in sufficient detail the quantity, size, and kind of metal to be charged to each batch of forgings. To offset this trouble, and to facilitate the working of the shop, he may be
5-79. allowed to hold a certain margin of stock and to account for same in this way without further vouchers being necessary. This obviates the need of booking returns of useful surplus as only the actual metal used, including wastage, will be reported. Following from this all metal issued to the smithy will be charged to the metals account (K 1-1) in the first instance, and then allocated to the orders con-
5-77. cerned through the Forging Delivery Sheets.

One advantage of this plan is that every forging will carry its metal charge, wherever the metal has come from. Odd pieces of useful surplus metal that are used up will be charged automatically, whether returned into stock or not.

The foreman's estimates of metal used are not likely to be infallible, and the stock of metal in the smithy (presumably kept in some order) will need to be taken at least several times a year to verify the posi-

Smithy Metal Costs.

tion of the metal account, of which a memorandum is kept in the Shop Charges Book, the same as for the foundries. Heavy lumps can have their weight painted on and the bars can be measured readily, more particularly if the size is kept painted on. For working out the corresponding weight the help of an estimator or draughtsman practised in the use of the slide rule, may be requisitioned. As the actual sizes of the bars will vary slightly from the nominal size, and calculation of weight can only be approximate, the stock at the end of the year needs to be actually weighed.

The wholesale or main stock of bars suitable for smithy use may advantageously be controlled by the General Stores. The stock control cards would record the bars issued to the smithy as being accounted for, and the Storekeeper might ignore the margin actually available in the smithy when requisitioning further purchases.

Iron Foundry General Costs.

Turning again to the Iron Foundry, some further consideration is necessary of some of the items falling under the heading of process general costs as tabulated in the suggested standing orders for the process accounts.

Fuel (G 2-1) and Shop Supplies (G 2-2) involve special arrangements for reporting the consumption in each account period. With regard to the less bulky supplies, the main stock may be kept at the General Stores and dealt out either at stated periods or in stated quantities. The last-named course is likely to be the more economical. Provided the quantities given out do not exceed say a week's supply, the issues may be unhesitatingly charged to the process cost account, as the figures for each period will not then be thrown out of balance to any appreciable extent.

The foundry clerk can retail these supplies with a minimum of entries. Squared sheets for each kind of supplies, with a square 5-68.
allotted to each man, can have the individual issues noted thereon to inculcate a regard for carefulness and to satisfy the Management as to what becomes of the items of more intrinsic worth, such as brushes, mallets, etc., but discretion must be used. These records, as far as they relate to utensils and implements, may be consulted when a foundry worker leaves, and the foundry clerk may possibly be empowered to sign his Tool Clearance Ticket. 5-21.

Fuel and supplies of a bulky or loose character, such as limestone, sand, blacking, flour, etc., can hardly be kept within the General Stores and issued in small lots as suggested above. Consequently, for these items the foundry clerk will have to make up a weekly 5-76.
report of the estimated consumption—using the cupola charge records for limestone and coke consumption. These reports will be sent to

Iron Foundry General Costs. the General Stores for stock control purposes and thence to the Works Accounts Office.

The cost sallocated to Defective Product (Standing Order G 4-1) 5-98. will be derived from the Viewing Reports relating to castings that are rejected for foundry faults. These costs will be transfers from the order to which the rejected casting was originally charged. In the case of castings rejected before leaving the foundry, the process account should be debited under this standing order at the ordinary process charge only, the metal remaining in the foundry scrap. There will be a difference between the standard mixture rate per cwt. and the scrap rate per cwt., but it is hardly necessary to consider in this connection the metal depreciation in a faulty iron casting.

It is a very important principle that all castings should be carefully inspected before being sent into Stores.

Brass Foundry General Costs. In the case of the Brass Foundry process general costs, the remarks made above as to the Iron Foundry apply in principle, and little more need be said. In view of direct labour in the Brass Foundry being averaged on the basis of weight, emphasis is laid on the necessity of grading the rates used in respect to the process general costs. In this case the process charge will have to cover not merely departmental service expenses, as in the Iron Foundry, but direct labour and shop charges on same as well.

The metal charge rate will be computed for each mixture as already mentioned, and a graded process charge rate applied. Suitable grades will be Intricate, Ordinary and Plain, rather than Heavy, Medium and Light, for a heavy casting may be intricate and costly in workmanship per unit of weight, and a light casting may be plain and cheap in workmanship per unit of weight. This question of grading requires the exercise of judgment, and the routine will be simpler and the practice much more consistent if distinguishing grade marks are put on the pattern by the foreman patternmaker. To arrive at the proper process charge rate for a given grade, it is better to define the grades as definite percentages above or below the average or ordinary rate.

In the matter of Brass Foundry wasters that do not leave the foundry, the metal deterioration is too marked to be ignored, and consequently a metal charge should be made representing the depreciation in value. A compromise may be admitted in regard to wasters of small weight, to save the trouble of applying metal charges of such small amounts. The process charge rates used for debiting the waster to its standing order (H 4-1) should be the same as would have been used if the casting had proved sound.

In the case of defective castings discovered after being charged out in the ordinary way, the casting itself should be sent to the General Stores and its value as scrap transferred from the original order to the Scrap Stock Values Account (Standing Order U 2-1), through which medium it is debited to the Stock Account concerned. The balance of the product charges will be credited to the original order and debited to the Defective Product Account (Standing Order H 4-1). **Brass Foundry General Costs.**

Smithy General Costs. The comments made relative to the Iron Foundry process general costs also apply in principle to the Smithy process general costs.

Defective product is not likely to figure to much extent in the Smithy accounts, and any correction found necessary by the Smithy foreman, after checking over the forgings before sending same into Stores, is better done under the original order than dealt with as an expense under Standing Order K 4-1.

Defective material is usually the main cause of defective forgings, and two courses are open in that case. The one is to transfer the whole product charge from the "net production cost" section of the order concerned to the "errors and defects" section of the same order. This gives the process account the benefit of the product, although defective. The alternative course is, to relieve the net production costs of the order concerned at the expense of the process account as being defective product. The latter is, perhaps, the better plan in stimulating the Smithy foreman to watch for faulty material.

Foundry Product Records. The method of recording foundry output is most conveniently based on the delivery ticket accompanying the castings to the Stores.

If only for the sake of checking weights it is desirable to have separate delivery tickets for each consignment, and this check can only be exercised with any regularity when all castings are received by a suitable stores instead of being delivered direct to the machine shop. 5-71.

The proper regulation of work in progress alone requires that castings should not be dumped in the machine shop except to a programme, and then only if the batch of castings required is complete, or if castings are large and heavy, in which case cost of transport would dictate as little handling as possible. A certain elasticity is provided in the suggestions previously made for regulating work in progress for adapting the machining sub-orders to the number of castings available, if it is not feasible to wait for the whole batch.

The point is made that a Work Depot is the most suitable centre for

Foundry Product Records. distributing castings, and simplifies the clerical routine considerably compared with using the General Stores, although it is better to have the casting first deposited at the General Stores, to be drawn out by the Work Depot as required—the Work Depot being advised of the castings being available by a Goods Issue Voucher.

This routine goes to ensure accurate allocation of castings, a point not so easily achieved when castings can be applied to more than one order, or will make more than one kind of part.

With the delivery tickets serially numbered, the Works Account Office can check that all of them are received.

The question of foundry wasters involves a different routine.

The natural tendency of any foundry foreman is not to disclose how many wasters occur within the foundry, and it is, perhaps, expecting rather much of human nature to rely on his volunteering the information. Apart from that, the routine necessary to get this information furnishes a record of considerable value in maintaining foundry efficiency.

5·73. Each day the foundry clerk is required to furnish a statement of all the castings moulded that day, the statement giving the moulder's check number, Order number, pattern mark, and number of moulds made, together with the time taken, for allocating the moulder's wages. Shop charges are applied on these Foundry Daily Work Sheets. If the casting in any mould is not made that day the item is marked as not cast. This statement has to be sent to the General Stores each evening, and then as the delivery tickets come through the next day for the fettled castings sent into stores, the items are checked and enquiry made as to any divergence, after which it can be passed to the Works Accounts Office for charging up.

5·72. The foundry clerk will issue Foundry Waster Tickets for each waster, duly certified by the Foundry foreman with the check number of moulder responsible, and this will be the basis from which the Works Account Office will make the necessary entries in the accounts.

The foregoing scheme can be applied in full to both foundries, but there will not be the same success in the matter of intercepting brass foundry wasters owing to the conditions of casting and fettling, while the clerical work involved will be rather excessive with the usual run of brass foundry work. Probably a compromise suited to the local conditions can be arrived at without giving way wholly as regards this method of control.

Smithy Product Records. In the case of the Smithy, the argument advanced as to distributing the product from the Work Depot holds good.

Smithy Product Records.

A further point arises over the notification to the Works Accounts Office of the kind, size, and quantity of metal used. There is little doubt that this information should be given on the Forging Delivery Sheet 5·77. to ensure that the estimating or investigating as to metal waste is done before the product leaves the smithy and to obviate delays in accounting if this work were deferred. Delays in sending the product forward should not, however, be excused on these grounds.

Pricing of Process Products.

The actual pricing out of process products involves the collation of the various elements of the costs pertaining to each item of product.

The source of the requisite information will be the respective delivery sheets and daily work sheets.

From the delivery sheet can be derived the metal and process charges, and from the daily work sheets, the wages and shop charges.

If the price or works value of any individual item of process product is required, the batch charges on the respective sheets require to be abstracted on a Rough Component Rate Card. 5·127. Average figures should be taken, if possible, of several batches, and a percentage added to cover defective work.

Where process products do not pass into stock in the rough or unmachined stage, the individual rates or works value will be infrequently wanted, and the respective orders will be charged according to the batch costs, from day to day, under the respective headings appearing on these delivery and daily work sheets.

The daily totals for all orders of metal, process, wages and shop charges are in turn summarised in the Works Expenditure Book 5·118. (Process Product Summary Sheet). From the Works Expenditure 6·44. Book a Works Products Abstract is prepared in the Works Accounts Office for the Financial Department.

This results in the respective process accounts in the financial books (manufacturing ledger) being credited with the total value of the output, and the *Works Materials Suspense Account* becoming debited with the same total, as materials to be accounted for.

The cost allocation treatment will be either to allocate the process product values to the respective production orders as "process product charged direct" or to General Stock Account or Component Stock Account, as may be appropriate.

In the latter event, the individual rough component rates should be settled for the stage of charging into stock, in readiness, therefore, for the stage when the process product will be issued from stock at an inclusive stock price.

Pricing of Process Products.

The grand totals of product values in the Works Expenditure Book are duly reported to the Financial Department on a Works Products Abstract, and the *Works Materials Suspense Account* in the financial books is debited accordingly, and the respective *Process Account* credited.

Wasters are dealt with the same as the ordinary product, except that the order ultimately charged is the Standing Order for Defective Product (G 4-1, H 4-1, K 4-1).

Process Account Surveys.

The process account figures and statistics necessary for accounting purposes should be rendered into suitable form for administrative or management purposes, and it will be convenient to designate such a summary as a survey.

The necessity for process account surveys will be apparent for testing the efficiency of the departments concerned, particularly if normal rates are used for process charges and shop charges. The difference disclosed in the process account as a whole will then be some index of the comparative efficiency of the department.

The lines laid down for arriving with some accuracy at the true cost of the individual castings and forgings should furnish figures from which to settle profitable selling prices, if the product should be sold unmachined.

Where a considerable trade is done in unmachined castings and forgings, it will be probably necessary to fix selling prices in grades rather than for each kind of casting. This in no sense discounts the value of individual costs, for these will indicate in what respect the selling prices are insufficient, and conversely, what lines of product give the maximum profit. Under such circumstances it may be worth while dissecting the costs of defective product according to the grades in the selling prices.

Average costs of process product per unit of weight will only really be of value where the character and volume of work done is consistently regular.

In the case of the Brass Foundry, the use of such average costs is usually about the only convenient course to take, and the arguments against it are discounted to a large extent by the relatively small proportion that the direct wages bear to the value of the product.

It is, of course, in regard to direct wages and shop charges on same, that average costs are so likely to be wide of the mark in any given instance.

Assuming for illustration that in a given case the metal charge per lb. was 7½d. and the process general costs averaged 2½d. per lb.

Process Account Surveys.

If the average cost is taken the product charge will total to 10d. per lb. If the true process general cost in this particular case was demonstrated to be 3½d. per lb., or 40 per cent. above the average rate, the proper product charge would then be 11d. per lb., which is only 10 per cent. in excess of the average price. With the effect of averaging costs minimised in this way merely by the high value of the metal, by the time graded rates are used, as previously suggested, there will be little ground to dispute the Brass Foundry Product Charges as reasonably accurate.

The accounts provided in the Shop Charges Book as to metal costs and process general costs for each department concerned, will furnish, in conjunction with the weight of output, the necessary figures for arriving at average metal cost and average process general costs per unit of weight. These figures will probably only be of limited use in the case of the Iron Foundry and Smithy, but they will be some guide to the Management in making comparisons, particularly with past records that have not been carried beyond that point.

An important step prior to using the metal cost figures for averaging purposes is to learn the value of the work in progress as regards metal. Some suggestions have already been made under this head.

With regard to process general costs of work in progress, in the Iron Foundry and Smithy the practice of allocating the direct labour and shop charges on same, independently of the metal and process charges, will allow that portion of the work-in-progress costs to be obtained without taking stock.

The process charges pertaining to work-in-progress, being based on the weight of metal in the product, can only be estimated from the weight of unfinished product.

As the process charges only apply in full to the product as delivered to the stores, it is simpler and of trifling consequence if process charges are ignored in valuing the work-in-progress.

This means that for the Iron Foundry and Smithy the Shop Charges Book figures of the process general costs only need adjustment in respect to the items of direct labour and shop charges for product not yet delivered into stores.

It is perhaps hardly necessary to attempt any definite proposals as to the form of the process account surveys. The nature of the business and the views of the Management will operate to give a special character to the survey in each instance.

A considerable volume of useful data can be derived from the accounts when in the form here discussed.

In the case of the Iron Foundry, statistics as to the ratio of the weight of iron melted to the weight of castings sent into stores can be obtained from the Foundry Stock Control Sheets on the one hand, 5·75.

Process Account Surveys.

5·71.

and the Delivery Sheets on the other. The use of lbs. on delivery tickets facilitates addition of totals and allows the use of the same mechanical means as used for totalling money value.

Other useful items on the survey may be :

Percentage Ratio of weight of wasters to weight of product sent to stores.
Percentage Ratio of fuel weight to product weight.
Average fuel cost per unit of product weight.
Percentage of metal loss on basis of metal costs.
" " " " product weight.
Average metal cost of product per unit of weight.
Average process general cost of " "
Average total cost of " "
Average direct wages cost of " "
Average number of product items per ton of product.
Percentage of difference (surplus or deficit) on Process Summary Account in Shop Charges Book.

Section IV h

Manufactured Stock Product.

Stock Sanctions.

The first stage in the discussion of manufactured stock product is to consider the conditions that should regulate the scope of the orders by which the manufacture is authorised.

To an extent the conditions will be the reflex of trade activities, but this has perhaps more influence on the quantity of stock than its character, and quantities do not necessarily affect the routine pertaining to Stock Manufacturing Orders. It may, however, be accepted as a starting point that the quantities for these orders cannot with safety be derived from any hard and fast rules as to maximum and minimum stock.

In the matter of spare parts for customers' repairs and replacements, the character of past business will largely determine the quantity of reserve stock that is to be held by the Works.

These reserve stock quantities should be carefully settled by conference of the Works Manager and Chief Designer, and then all priced out for approval by the General Manager as to the total values involved.

In a sense the reserve stock quantities authorised may be considered as the maximum stock limits, but this will probably only be true for those items that are not being used in current designs, and, therefore, for which no further authorisation of stock is likely to be made.

In conjunction with the reserve limit, there should be an ordering limit fixed to facilitate stock control, but the point is one to be settled by Works conditions. Where the shops are slack, reserve stock may be made up, perhaps, without waiting for the ordering limit to be reached, and when the shops are congested it will probably be necessary to give longer notice of reserve stock requirements than when working under normal conditions.

Stock Sanctions.

As to the manufacture of stock product for future sales, as distinct from the reserve stock intended primarily for repairs and replacements, this raises issues that can only be determined in the light of the selling policy of the company, and the state of trade. The matter is one of such importance that the sanctions for putting in hand stock product should be derived from the Directorate. The form of the sanction may very well leave some discretion with the General Manager as to the most economical method of carrying out the intention of the sanction. The lines upon which the sanction will be drafted will presumably be to make a certain quantity of certain standard types of complete product (machines, engines, etc.). It may be that some parts or components will be common to several types, or it may be that there is a standard nucleus type which can be adopted to meet sales requirements by varying certain details, in themselves standard, and yet making when complete a particular variation from the standard type.

Another factor is the minimum quantity of certain components that may be made with reasonable efficiency. This quantity may easily exceed the number necessary for the complete products authorised. It may be remarked here that it is quite possible to give too much weight to this consideration and to accumulate surplus stock that will destroy any initial economy in the cost of production per piece, and what may have been as unsatisfactory, will have held up the saleable output of the factory needlessly. On a given item these considerations may not amount to much, but taken in the bulk the pursuit of manufacturing efficiency on these lines may prove misleading, if only that the existence of surplus stock will not control market conditions, even if it steadies the Drawing Office in making amendments in designs.

The many conditions that enter into the question of stock manufacturing orders make it imperative that the orders shall be built up very carefully as to quantities required of the various details.

The terms of the stock sanction should be faithfully followed and only exceeded in regard to any detail with the approval of the General Manager.

It may be the function of the Works Office to interpret each sanction in terms of the definite or minimum quantities required of each component. The question of putting in hand additional quantities as a reserve to provide against defective material or work is one to be dealt with by the Works Office, in conjunction with the stock control records of reserve already provided and the probabilities of each case.

Each new line of product will necessitate extensions to the range of authorised reserve stock.

Stock Sanctions.

It will probably be found better for all castings and forgings ordered on behalf of reserve stock to be put into stock, in the first instance, as rough parts, and for the machining to be undertaken only in accordance with the programme laid down in outline by the Works Office and worked out in the Work Depot. One advantage in such a course is that the Works Depot Chargehand may possibly have authority delegated to him to initiate requisitions for rough components for reserve stock without having to obtain individual sanction from the Works Manager, and if these rough components are put into stock (presumably in the General Stores, certainly not in the Works Depot) further action can be dependent on specific authority to be obtained in each case from the Works Office, acting directly under the Works Manager's instructions. A daily sheet of proposed machining orders for reserve stock may be the best medium for obtaining the requisite authority.

Provision of Jigs and Special Tools.

The difficulty that faces the Works Manager frequently in connection with new lines of stock product is how far to go in the matter of jigs and special tools. His path may not be made easier by the accounting practice advocated of including all costs of jigs and special tools with the costs of the order for manufacturing the product. The costs are, of course, kept in a separate section, but they are there and will not be hid. It is easy to say that the Works Manager must have the courage of his convictions and make all the equipment necessary for turning out the complete product at such a cost as will allow for the cost of Drawings, Patterns, Jigs, and Special Tools to be recovered from the sale of a reasonable quantity, and, of course, low enough to give a profit at market prices after allowing for commercial expenses.

The question of how much to spend on new jigs and special tools is mainly dependent on the selling policy for the particular line of product under consideration, and no very useful remarks can be made here, except that the whole initial cost should be weighed up beforehand and that the Works Manager should derive the necessary guidance from a conference with the General Manager, Sales Manager, and Chief Designer.

The method proposed for ordering jigs and special tools is dealt with elsewhere.

Pricing of Manufactured Stock Product.

When stock product has been manufactured, the problem arises as to the price or Works value to be placed upon it.

So far as the net production costs are concerned, the total costs divided by the quantity produced may be said to give the proper Works price per unit of product. This, however, ignores the costs of errors and defects, as also of drawings, patterns, jigs and special tools.

Pricing of Manufactured Stock Product.

Even the net production costs may be abnormal for the first batch of a new line of product, and, if that fact is clearly established, it is equitable to transfer a portion of such costs to Developments and Experimental Expenses, which constitute a charge on *the Works Profit and Loss Account.* The cost of errors and defects may possibly come within the same category on the first batch, but hardly on later batches.

Drawings and patterns for stock product are not susceptible to obsolescence, by reason of modification of design, to the same degree as jigs and special tools. It may therefore be in order to consider that a larger portion of the costs of drawings and patterns than of jigs and special tools can be legitimately capitalised to the relief of the stock manufacturing account. It is, however, very desirable to transfer as little as possible of such costs to capital expenditure.

The costs in these two connections that are not capitalised may be deemed to constitute part of the Works costs of the product, and the only query is, over what quantity of finished product the costs shall be distributed.

After the approved adjustments have been made of the net production costs, on the ground of development expenditure, the average cost of each unit of product in the first batch may have a definite percentage added to cover its estimated proportion of the costs of errors and defects, and of drawings, patterns, jigs and special tools. This will, as a total, constitute the Works price of the product in question. The costs of succeeding batches may be expected to modify the original Works price of the product, and in due course a virtually standard price may be admissible for stock account purposes that will ignore small fluctuations in costs.

The foregoing remarks rather assume that each Stock Manufacturing Order covers the manufacture of the exact quantity of components required for a definite number of units of complete products, together with the work of assembling, erecting, and testing same, and, of course, all incidental standard fittings (bolts, nuts, etc.).

When standard assembly units are the rule, separate Stock Manufacturing Orders may be issued for each variety of unit, and a further order for their erection together to form complete products.

In practice, these conditions will be quite frequently subject to some amendment, but not necessarily sufficient to destroy the value of an average of the resulting total costs for pricing the unit of product. When for an intended batch of complete product units it is necessary to put through alternative components to meet possible

Pricing of Manufactured Stock Product. variations in sales, it may be admissible still to use an average price for the complete product.

A more accurate method will be to manufacture under the original stock order only the components for the nucleus standard type, and to issue separate orders for the variable components, which would have to be put in stock as finished components and drawn as materials for completing the erection of the product in readiness for sale. Separate erection orders for each combination would, of course, be necessary for accuracy in the average costs of each combination.

An alternative that allows for any combination of components is to issue separate orders for every component, and to put the finished components into stock to be drawn as required for assembling. An objection to this course is the difficulty of regulating the output of complete assembled product when there are so many orders to be controlled without the aid of a common reference to those orders pertaining to the complete product in question.

A compromise has been recommended elsewhere by which Machin-
5-100. ing Sub-Orders are issued for batches of components and Assembling
5-101. Sub-Orders for standard assembly units or other convenient sections
5-102. of the complete product. Further Erection Sub-Orders are issued
for erecting the several assembly units necessary to form a complete product. Under these circumstances, the original Stock Manufacturing Order may be for complete products—the sub-orders serving to sectionise the costs as well as regulate the production—and the scheme laid down for associating the costs of drawings, patterns, jigs and special tools and of errors and defects with the main order can be carried out quite simply.

5-128. In building up the Works price of individual components, the use of a percentage addition to the net production costs, in respect to drawings, etc., is not quite as satisfactory as in the case of the complete product. Some components may entail no expenditure for patterns, and others none for jigs and special tools, while in some instances the expenditure on this account may be very high proportionately. It may be expedient in pricing unassembled components, as to their Works value, to ignore the incidence of this expenditure, but the facts of each case require to be duly considered in the fixing of selling prices of spare parts. Other costs, such as case-hardening, may have to be considered in much the same general way as circumstances may dictate.

Component Works prices may be fixed with more reliability if all the operations are listed, and the average cost of each operation filled in with the proper shop charges for the particular machines used.
5-63. The rate-fixing records may, and probably ought to, serve this purpose better than the cost accounts.

Pricing of Manufactured Stock Product.

However the Works values of stock product are arrived at, care must be taken that they never exceed the realisable price, viz., the net selling price, less the average commercial expenses. There should never be any thought of using cost figures for inventory purposes that exceed this amount in the hope of matters coming right in the "blend" of business. The loss on any line of product should be kept in evidence until the costs of production are made to fall within the limit that will allow a profit to be made on that particular line.

Mass Production.

A reference is necessary to the accounting problem incidental to mass or continuous production of one line of product, such as rifles, typewriters, locks.

Separate cost allocation accounts for every batch may easily involve too much clerical work of little use. For this reason the cost figures necessary for pricing the product and correcting the prices to date will have to be derived from special investigations from time to time.

Under these circumstances the costs can be aggregated for the different details under suitable references, virtually Standing Order numbers, and the output of the details duly credited to the respective accounts. This maintains the general scheme of Works accounts without undue or relatively valueless sub-division.

In some cases the plan is adopted of specially marking particular Stock Manufacturing Orders for which the costs are to be taken out. This may tend to an unduly favourable showing, but should obviate special investigations after the event which are likely to involve a great deal of time when carried out conscientiously.

Stock Manufacturing Account.

The present scheme of Works and Financial Accounts provides for separate cost accounts being kept for each stock manufacturing order, and for the inclusive costs of the whole series of stock manufacturing orders to be aggregated in the financial accounts as a debit to *Stock Manufacturing Account.*

The delivery tickets of finished stock product which the Works Depot will furnish to the Works Accounts Office, will be duly priced out on the lines laid down, and entry made accordingly in the Works Expenditure Book. 5-108. 5-119.

The fortnightly totals of the value of the output of stock product will be reported to the Financial Department by means of a Works Products Abstract. The *Stock Manufacturing Account* will be credited accordingly and *Works Materials Suspense Account* debited.

From the Works Expenditure Book the product delivered into stores is entered in the Stock Ledger under the respective stock accounts concerned.

Stock Manufacturing Account.

The Works value placed on the product made under any given stock manufacturing order may not exhaust the costs by reason of the balance of costs remaining in respect to drawings, patterns, jigs and special tools, or, under subsequent repetition order, the product may be charged out in excess of the costs by the amount of the percentage additions to direct costs made to cover drawings, etc. Independently of these factors, there may be fluctuations in the costs on successive batches, though with continuous production the costs should steadily decrease, if due consideration is given to increasing operation efficiencies, and if the methods of remunerating the workers encourage the development of individual efficiency.

So far as the Works accounts are concerned, the differences between Works value of product and the production costs are summarised in the Shop Charges Book under a Stock Manufacturing Differences Account. Undercharges appear on one side of the account and overcharges on the other, and the balance between the two is periodically transferred to the Shop Charges Supplementary Account in the same book.

In the financial accounts the adjustment is made in this respect when the accounts are closed at the end of the year and after allowing for the value of stock work-in-progress, any remaining difference is transferred to the *Works Profit and Loss Account* in the financial books as a profit or loss on the *Stock Manufacturing Account.*

Conversion of Stock Product.

It will occasionally happen that stock product requires to be converted or altered in some respect to obviate it becoming obsolete.

The simplest course is to issue a Stock Manufacturing Order for the conversion, and to allocate the value of the product in question as it appears in the Stock Accounts, to the conversion order, and then to deal with the converted product on the lines already laid down for the original product. Care must be taken to fix a proper works value for the converted product which may, or may not, be the same as that of the original product. The loss incidental to these conversions will necessarily go to swell the cost of manufacture without the Works having been responsible for it being incurred, but the alternative would be an ultimate heavier loss in stock values, which would be bound to fall on the Works profit and loss account.

Suspended Stock Manufacturing Orders.

When stock manufacturing orders have to be interrupted for more urgent work, or where, for lack of efficient production control, such orders are used to mark time on, costs will be high and the product may take an excessive time to get finished. Sometimes the production control will ensure that all work is suspended when there is no demand for a particular item.

Suspended Stock Manufacturing Orders.

Whatever causes unduly prolong the completion of Stock Manufacturing Orders, it will be often found advisable to call the material in and to close the order. It will be admissible, if the material will be useful ultimately, to charge the material value back into the Stock Account of reserve rough components. Any wages expenditure had best be transferred from the Cost Ledger to the Stock Manufacturing Differences Account (Shop Charges Book) at once, as a loss or undercharge on the orders in question. Should circumstances require the rough components to be drawn from stores and completed later on, the labour previously expended will be recovered in the price placed on the finished product, and this will mean a corresponding gain to the Stock Manufacturing Differences Account.

This line of action may seem drastic in its first stage, but it clears the shop floor, and clears the accounts. If, on the material being drawn out for completion, the original wages expenditure is not traceable readily, a careful estimate of the Works value of the finished product will be quite admissible under the circumstances.

In certain cases the material on suspended stock orders may be temporarily retired to the Work Depot, but this does not clear the accounts, and probably only postpones the more drastic action.

Stocktaking.

Section **IV i**

Problem of Stocktaking.

STOCKTAKING is the taking of an inventory of stock usually for the purposes of the annual balance sheet or on the sale of the business.

6-51.

In the specimen Summarised Balance Sheet under Financial Accounts (Section VI g), the items that stocktaking covers are referred to as Stock of Stores, Timber, Metals, Loose Plant, Tools, etc., and Work-in-Progress. "Stores," in the sense used there, may be interpreted as the ordinary goods held in the Stores Department other than Timber and Metal. The expression as a whole is a conventional one, that means virtually all loose assets in the Works other than Drawings and Patterns (and, under some conditions, Jigs and Special Tools may be dealt with separately like Drawings and Patterns).

In the case of Drawings and Patterns, Jigs and Special Tools, the policy advocated is to allocate the costs of same in the first instance to the orders for which originally required and to transfer as little of that cost as possible to capital account. Under such conditions the book value of these items will hardly need to be corroborated by an inventory.

Under certain conditions of mass production, where staple lines

Problem of Stocktaking.

are manufactured continuously, the loose equipment is likely to be so largely special that it may be too serious a matter to exclude jigs and special tools from the annual inventory, and in that event the methods hereafter proposed for valuing loose plant will need to be amplified accordingly. The suggestion may be made here that, in such cases, the equipment should be grouped according to the individual lines of product on which used, and the group values considered in the light of prospective sales of each line.

It will be observed that buildings, machinery, and fixed assets generally are assumed to be outside the range of the annual stocktaking. This arises from the fact that fixed assets can be valued from the accounts with confidence, if adequate care is taken in the recording of Works additions expenditure. The valuation of buildings, machinery, and fixed plant is considered elsewhere.

Turning to the scope of stocktaking as ordinarily necessary, the divisions to be dealt with, in pursuance of the lines provided in the present scheme of Works accounts, are as follows :

General Stock.

Raw Materials.

- Iron and Steel.
- Non-Ferrous Metals.
- Non-Metallic Materials.
- Timber.

Shop Supplies.

- Drysalteries.
- Fuel and Process Supplies.
- Oils and Greases.
- Painting Supplies.
- Plant Supplies.
- Utensils and Implements.
- Stationery, Office and Packing Supplies

Hardware.

- Sundries.
- Pipe Fittings.

Component Stock.

- Standard Fittings
- Reserve Stock of Components—rough or unmachined.
- Reserve Stock of Components (Spare Parts), finished.
- Assembling Stock of Components—finished.
- Complete Products.

Work in Progress.

- Iron Foundry Process Account (including scrap metal).
- Brass Foundry Process Account (including balance of metals).
- Smithy Process Account (including unworked metals).

Sales Orders (Series A). Sales Repairs Sundries Orders (Series B). Stock Manufacturing Orders (Series C).	Manufacturing Departments. Repairs Department. Testing Department. Tool Room. View Room. Work Depot. General Stores (Special Materials not issued).

Loose Plant.

- Belting and Driving Ropes.
- Gauges and Measuring Appliances.
- Hand Tools—Engineers'.
- Holding Appliances for cutting tools.
- Holding Appliances for work.
- Machining Tools.
- Ordinary Utensils and Implements.
- Portable Mechanical Appliances.
- Portable Shop Accessories.
- Special Trade Tools and Accessories.
- Testing Gear.
- Transportation, Lifting and Weighing Appliances.

Packages.

- Packing Cases, Crates, Drums, Barrels, Bags, etc.

Office Equipment.

- Office Fixtures.
- Office Furniture.
- Office Accessories.

Problem of Stocktaking.

The work of Stocktaking covers the actual counting and weighing of stock, summarising, valuing or pricing, and extending the items and comparing the result with the book values as given in the Works accounts.

The existence of a complete and reliable system of Works accounts will allow the work of actual counting and weighing to be done on organised lines, and to a very large extent before the date for which the inventory has to be rendered.

Reliable Works accounts will mean a severe test of the accuracy of stocktaking, and the very conditions that allow the work of stocktaking to be organised in advance will enforce a high standard in that work.

However trustworthy the works accounts may prove to be, it will not be admissible to accept book values of stock in lieu of actual count and weighing, without at least an extensive verification or scrutiny.

For the counting and weighing processes of stocktaking it is very common to close down the factory for a few days, sometimes for a week, at the end of the financial year. Usually the interval is put to good use in other directions, such as overhauling power and transmission plant, whitewashing building interiors, etc., but when the financial year ends on December 31st, as so commonly is the case, the weather conditions are not particularly appropriate for stocktaking or repairs. The growing tendency to close down August Bank Holiday week for an annual holiday for all grades of works staff and workmen, gives an alternative opportunity for annual repairs, and is some inducement to organise stocktaking on such lines that a very brief stoppage at the end of the year will suffice.

There is the other aspect of stocktaking, namely, the clerical work after the event. This is not only apt to be of a laborious character, but can seldom be done very satisfactorily by other than the regular staff, with the consequence of entailing excessive hours and a dislocation of current work. The delay that often ensues in the presentation of the final returns is itself a very serious indictment of the methods used. Prompt returns are sometimes achieved by virtually rough and ready ways which, under some conditions, may be more acceptable to the Directors than more accurate returns that are rendered less promptly. Such rough and ready ways can hardly be tolerated if the scheme of the works accounts is such as to set a high standard of accuracy.

It is, therefore, part of the problem of stocktaking to get prompt results by the regular staff without excessive hours, and within the limits of accuracy prescribed by the works accounts. Some congestion of work at such a time can hardly be avoided, but it can be

Problem of Stocktaking.

brought down to manageable proportions if each fortnightly account period throughout the year carries its own burdens, so that the course is clear at the year end for balancing all Works accounts speedily.

The important function of Works account balances in regard to stocktaking consists in confirming the inventory figures and ensuring that no item is omitted.

While the desirability of employing the regular staff holds good, the existence of properly planned works accounts make it safe to parcel out the stocktaking work with confidence to any clerical staff that can be commandeered for the purpose, without relying solely on the efforts of the Works Accounts Office. A programme should be drawn up beforehand, under which all the office staff, works and commercial, are made responsible for specific elements of the work, which, when done, absolves them as to the rest of the programme. In such event each party must appreciate that any carelessness discovered in his work will be considered by his own chief as a breach of duty. The elements listed above may suggest the lines to be followed in arranging a programme both of the stocktaking itself and its concluding stages.

There is the further possibility of utilising outside agencies for the extensions and totalling.

There can hardly be any question, for the above reasons, of all inventory records being prepared on loose sheets, to be finally bound in sections before being submitted to the Company's auditors. In this connection it may be remarked that the inventory sheets should only be written on one side, and that each sheet's totals should stand alone and be summarised on separate sheets. The summary sheets for all sections can advantageously be bound together, and then as the detail sheets are audited and agreed with the summary, they can be passed back to the Works Accounts Office, only the summary being retained permanently in the Financial Department.

The simple device of each sheet's totals standing alone, instead of being carried forward to the next sheet and so on, has far-reaching effects in getting the work forward, and any errors that are discovered in checking or auditing will only affect the summary of the sheets totals. Obviously the sheets of each section must be numbered before being parcelled out to the different clerks, and each sheet must be initialled by the staff doing the different stages of the work, viz., checking entries from stock tallies, certifying rates and checking extensions.

Preparations for Stocktaking.

With regard to the preparations that may be suggested for stocktaking, there is something to be said for reducing the volume of

Preparations for Stocktaking.

work in progress as much as possible, and still more for clearing up old orders, but, except in the case of seasonal industries, when stocktaking coincides with the slack season, as it obviously should, there is danger of lowering the pace of the shop after stocktaking if too much stress is laid on having a clear shop floor.

In the case of purchases, it is certainly desirable to avoid delivery of goods so far as practicable immediately before stocktaking, but it is possible to cut this matter too fine, for the unceasing supply of materials of the right sort is the fundamental basis of output efficiency.

Interference with output will always be too big a price to pay for a saving in the stocktaking labour.

As for scrap that has to be disposed of, its collection should be continuous, to keep the shops clear at all times, though stocktaking may be made a good reason for more heroic efforts when same are necessary. The disposal of scrap is a question of market prices to an extent, but any bulk of saleable scrap should be avoided at stocktaking, as involving either very rough estimates of quantity, or an unnecessary and comparatively costly handling of same, not to mention the possible difficulty of forecasting the price that the scrap will realise.

It will be advantageous to have the tare of all barrows, trolleys, trays, portable bins, etc., confirmed and painted on as stocktaking approaches. It may be well also to hire extra weighing machines, as the cost may be easily saved in overtaking the work in different departments or localities simultaneously.

The character of the stores organisation must largely affect the work of stocktaking and influence the feasibility of any advance preparations.

The scheme suggested previously of holding certain classes of goods in two divisions of "wholesale" and "retail" is especially valuable at stocktaking. Goods such as those classified under Standard Fittings are perhaps the best example. In such cases the retail or broken parcels would not be counted until the date of stocktaking, whereas the wholesale stock would particularly lend itself to advance counting. In making up parcels for wholesale stock, and for counting any quantity of comparatively small details, the use of counting or proportional weighing machines is to be strongly recommended. These can be arranged for counting tens and multiples or by dozens and multiples, and the former is the better style, in that most of the stock control records can be kept more advantageously in unit quantities. The general adoption of units for recording quantities, in lieu of grosses, dozens and odds, and the use of lbs. for recording weights, in lieu of cwts., qrs. and lbs., would materially

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simplify stocktaking, apart from other considerations, but weighing machines, price records and ready reckoners will usually impose limitations that will involve some trouble to remove, though once removed the gain will be permanent and far-reaching.

Weighing machines that will record the weights placed on the platform will prove very useful in stocktaking. Incidentally it may be mentioned that with heavy materials two weighing machines and two gangs of men may advantageously serve one stocktaking clerk.

5·139. In the different stores it will be a great gain if Stocktaking Slips are made out some weeks before stocktaking for each item, as to references, description and usefulness.

The question of usefulness of stock is very important and is a matter that requires thorough treatment by persons fully qualified to exercise the necessary judgment. The difficulty lies frequently in getting enough consideration given to the matter. In the case of general stock, the storekeeper may possibly be qualified to draw up lists of standard kinds and sizes, and when these have been approved all other stock may be conveniently termed " non-standard."

Non-standard stock is not necessarily bad stock, but its usefulness to the factory is in some doubt, and the fact must be indicated on the Stocktaking Slips.

In the matter of component stock, the authorisation of reserve stock quantities, rough and finished, will supply the necessary data as regards usefulness, and the slips may be marked either authorised or unauthorised as may apply.

The Works Manager should confer with the Drawing Office and Repairs Department to amend or confirm the authorised list of reserve component stock from time to time, particularly before stocktaking.

The advantage of dividing the general stock into standard and non-standard, and the component stock into authorised and not authorised, will be further discussed in connection with stock valuation.

Assuming that stocktaking slips have been made out and attached to the respective bins, etc., a further stage may be undertaken towards stocktaking, viz., for the Stores staff to take the stock gradually and mark same on the slips. Immediately this process is started, all receipts and issues must be indicated on the slips and a line drawn if any such entries are found on the slips when the stock comes to be taken. All entries after first taking stock will, of course, qualify the total in stock accordingly.

With this work well started, the Works Accounts Office clerk, who is ordinarily responsible for stock scrutiny, as previously referred to, will need to increase his attention to this matter, and may be helped out by one or two apprentices of the type that are keen to extend their experience into the commercial field and will not take a narrow-minded view of such good opportunities. It will of course always be desirable for stock to be taken in the presence of the party responsible for stock scrutiny.

Preparations for Stock-taking.

If the stock scrutiny serves to verify the stock given on the tallies on the bulk of the stock items, the official stocktaking on the actual date will resolve itself into an extended stock scrutiny, with the important difference that only such items need be counted again on that date as is necessary to prove that all receipts and issues have been entered on the tallies since the stock as entered on the Stock-taking Slip was taken.

This comprehensive stock scrutiny should have its official character emphasised by the co-operation of independent officials. The main point is to establish such discipline in the Stores prior to the official stocktaking that the chances of errors through carelessness or mis-adventure may be reduced to a negligible minimum.

It may be well for the Management to bear in mind that errors in stocktaking are practically inevitable when all and sundry have to be put on the work, to get every item actually counted and weighed during the official stocktaking, so that any risk that is thought to attach to the present suggestions is not necessarily greater than under any other scheme and ought to be far less.

Another preparation process is necessary to ensure that there shall be a stocktaking slip for every lot of goods, and that every slip shall be duly transcribed on the stock inventory sheets. The method 5-140. recommended is to use numbered tickets made up in the style of cash tickets as commonly used in retail shops, viz., a counterfoil with perforated ticket attached with the same numbers appearing on both. These numbers will constitute lot numbers and no number should be used twice, however different the connection. The perforated tickets will be attached a few days before stocktaking to every lot of stock that a careful search can discover, and the location reference, for the most part the bin number, will be entered on the counterfoil and on the stocktaking slip as well. The counterfoil must be marked to show that the lot number has been entered on a corresponding stocktaking slip.

The collection of the slips in proper sequence of lot numbers will be facilitated if the lot numbers run in sequence vertically down rather than horizontally across the stacks of bins.

In the case of the stock of complete product it may be assumed that tallies giving all particulars, notably manufacturing order number and date, will be kept permanently attached to every item, so that it will be easy to make out stocktaking slips for stocktaking purposes. The lot number tickets may be used here but may require

Preparations for Stocktaking. to be pasted on, and in the case of old stock the reference may be useful at the next stocktaking if the old lot number is noted on the stocktaking slip before the new lot number ticket is pasted over the old one. These lot numbers may also be usefully noted on the stock control cards for identification purposes if the item is not strictly present standard. It will be convenient to enter up the stock direct on to Stock Inventory Sheets, the lot numbers being quoted and grouped to correspond with the classes obtaining in the sales records.

The preparations for stocktaking discussed above should be made the subject of careful instruction adapted to the local circumstances, and the names of the persons responsible for each stage in each stores should be clearly set out.

The need for specific instructions and definition of responsibility will hold equally good for the stocktaking of Work-in-Progress, Loose Plant, and Office Equipment.

The preparations possible for Work-in-Progress must be so dependent on the nature of the business that no very definite suggestions can be made. Generally speaking, the best line to take will be to accumulate as far as possible all work, not actually in hand immediately before stocktaking, within the Work Depot, and after that within the View Room, and what then remains in the shops, not actually in hand, should be collected in one or two definite areas within the shops. Such arrangements should hardly be foreign to the normal method of running the shop, except perhaps as to the work for the next job not being placed near the respective machines just before stocktaking.

5·141. The advance preparations of Work-in-Progress Slips on the lines suggested for Stock Tallies, will probably have to be limited to the items in the Work Depot, though something may be possible in that direction in the View Room, as well as for work on the shop floor. In the case of work actually in hand at closing time before stocktaking, each workman can very well make out a slip, or his chargehand for him in certain cases, and these can be collected before he leaves his work—the man's check number and operation in hand being entered on the back of the slip.

The problem with work-in-progress is to get the stage at which the work has arrived indicated sufficiently clearly for valuing purposes. The entries on the slips should, therefore, be checked against the work itself by the persons responsible for its valuation, such as estimator and the ratefixer. The material weight of all work-in-progress should be recorded as far as ever practicable, and this can be proceeded with by less technical help than is necessary for making the slips out or describing the condition or stage of the work.

The application of lot numbers to work-in-progress is not as useful

Preparations for Stocktaking.

as for general and component stock, because the location reference will be so short-lived, otherwise it might save much time in finding the items after stocktaking for confirming valuations. Under a proper scheme of regulating work-in-progress, the location question should not be serious, and may never arise if the slips are properly checked at the time of collection as suggested.

Instead of lot numbers being given by separate tickets, the slips can be numbered for the same purpose, and if prepared from the records of the Works Depot, the lot or slip numbers can be indicated there, and there will be little trouble in ensuring that no item of work-in-progress has been overlooked. A more direct scheme, and one likely to be more effective, is to rely on the sub-order reference for each lot, when sub-orders are issued on the lines advocated.

Coming to loose plant, the scope and organisation of the Tool Stores will affect the preparations considerably. If there is a reserve Tool Store for the margin of tools over and above common requirements, this stock can be dealt with the same as general and component stock as to stocktaking slips being filled in completely. In the case of the tools on regular loan, a list prepared of each kind of tool by the Tool Store Chargehand on suitable Loose Plant Inventory Sheets will be the better way, the quantities being subject to con- 5-144. firmation at the official stocktaking.

In the matter of the tool kits on permanent loan to the men, the tedious process of examining each man's kit can be minimised if tool books are in use on the lines previously proposed. The tool books 5-92. can be analysed and a certain number, preferably all, verified round about the annual stocktaking date, though not necessarily before then, by the Tool Store Chargehand.

In certain departments there will be considerable loose plant that can only be dealt with by collecting together and counting or weighing same. The departmental foreman will, in his own interest, get the work of collecting the items advanced as much as possible, and he may even be made responsible for rendering a return of loose plant in his department. It will be a great help if the foreman's statement can be accepted, and, with the loose plant accounts kept on the lines advocated, there will be means of criticising these statements. Beyond that the basis of valuation may be expected to minimise the seriousness of any likely errors. As a matter of fact, to send office representatives into the shops for this purpose introduces a medium for making the records that must be dependent on the foreman or a mechanic for most of their technical information, and withal, such a man has not the influence over the labouring staff necessary for expeditious work nor the opportunity of getting the work done in advance to any useful degree.

Preparations for Stock-taking. It will make for better results, and mean a distinct saving in clerical labour afterwards, if each foreman renders his return on Loose Plant Inventory Sheets under the different headings as laid down by a loose plant classification list. From this source he can derive his instructions as to the details required for valuation purposes.

Packages are an item of stock that fall well enough under the heading of loose plant. It may be assumed that as far as possible every supplier's package will be returned before stocktaking.

Packing cases made specially for continuous service in connection with production are, of course, loose plant in the strict sense of the term, and effort should be made to get these back before stocktaking, though letters from the parties in question acknowledging their possession will serve as certificates to support their inclusion on the Stock Inventory Sheets.

Office equipment can be inventoried with safety a little before stocktaking if due regard is paid to any additions about that time. Measurements necessary for valuation will not require to be repeated each year, but the slavish repetition of a previous year's inventory must be avoided, as office equipment items of a very portable nature are likely to have a high value in these days of labour-saving appliances. Their existence and condition should be verified each year. Incidentally such annual inventories are of important use in case of fire.

Goods on Loan. A matter of possible consequence at the annual stocktaking is that of goods on loan.

Packages sent out for which no charge has been made is a possible instance of goods on loan, but it may not be policy to insist on their return in time to be included in the stock valuation, and it may be doubtful practice to assume an amount for such unreturned packages in the stock inventory. If such packages have been invoiced or charged out, their inclusion in the inventory will not be permissible.

In regard to goods sent on loan or on approval in the ordinary sense, these should be dealt with in the Financial Department as having no further concern to the Works unless returned.

Stocktaking is obviously a time for all loans of goods to be settled up as far as practicable, whether related to goods loaned within the Works, goods received on loan or approval, or goods sent out on
5·83. loan or approval. The book used for acknowledging sundry goods received will provide the basis for clearing up the items for which the Works are responsible and prevent such items being wrongfully included in the Company's stock. A separate inventory sheet should be made out for loaned property in hand at the time of stocktaking, and this must be clearly marked to prevent misunderstanding.

Valuation of General Stock.

An important condition in dealing with the valuation of general stock is that the Stocktaking Slips be sorted out to correspond with the sequence of accounts in the Stock Ledger. 5-123.

If all the items pertaining to the same stock account are grouped together, it becomes possible to insert the stock ledger balance alongside, and this should serve to bring out serious errors in either the stocktaking or the Stock Account. 5-126.

In the matter of pricing, the purchase costs must be followed consistently, so long as they do not exceed the current market prices. The fluctuation of market prices will not affect so very many items usually, and consideration under this head will be mainly centred on non-ferrous metals.

The terms in which the certificate of stock in hand is rendered to the Auditors should be that the stock has been taken at, or under cost price, and that in no case does the value exceed the market price.

Reference has previously been made to stock being standard or non-standard, and this division is of vital importance in the inventory as a whole, but it is desirable not to differentiate in pricing the items.

It is necessary to make a deduction from the total stock values in respect to the liability of certain items proving bad stock, much the same as in the financial accounts a provision is made for doubtful debts in appraising the asset value of outstanding debts.

Separate Stock Inventory Sheets are used to differentiate between standard and non-standard stock. 5-140.

If the works organisation is not sufficiently advanced to carry out a scheme of standardisation, the grouping may be under the heads of good stock and doubtful stock.

Attention is directed to this matter, as investigation in many works would discover large stocks of doubtful value, that have been bought to some recognised commercial specification and have no peculiarity or fault beyond that of not being in current demand by the Works. Having made this division in the stocks, attention can be concentrated on using up the non-standard stock, and ultimately reducing the amount of investment necessary in general stock.

Excessive stock of a standard item should be treated, as regards the excess, as non-standard stock in view of the long period necessary for its consumption.

Millwright supplies and the like that have not been issued from the General Stores, and, therefore, not charged to Works repair or other orders, may quite properly be included in the stock inventory at full price, subject always to adequate confirmation as to their usefulness.

Reference may be made to stationery stock, and so far as this is

Valuation of General Stock. special in any way to the Company's business, it should not be valued in the stock inventory, although advisedly held under proper stock control. Such stationery should have been charged to expenses, either works or commercial, as received.

Valuation of Component Stock. The foregoing remarks as to the valuation of general stock apply fully in principle to component stock. As already advocated, the reserve stock of components should be distinguished as to whether "authorised" or "unauthorised," and adequate reservation should be made in the final total values in respect to the unauthorised stock. As with general stock, the detail prices of doubtful stock should be left intact.

The reservation of doubtful stock should be fixed independently each year on the general merits of the position, but if the gross amount does not decrease the reservation should be increased, as increased age in the unauthorised stock will emphasise its dubious usefulness.

Valuation of Complete Product. In the case of complete product it is necessary to treat each item on its merits. If the individual works values have been fixed properly, there may be little need to review the inventory values, but, as a matter of precaution, this section of the inventory should be scrutinised to ensure that the probable realisable prices, after providing for selling expenses, have not been exceeded.

As regards deterioration due to age and depreciated market values, owing to supercession of design, these should be provided for in the inventory valuation, by writing down the individual values. In the event of a sale later, the depreciated or book value would be charged out. In the matter of items for which the design still remains the Company's standard, but which is selling very slowly, the individual items need not perhaps be permanently depreciated, but some reservation must be made in the total values.

Valuation of Work-in-Progress. The valuation of work-in-progress is best considered as the process of confirming the cost ledger balances, and approximate estimates of the values may, therefore, be admissible. It is usually not a safe practice to assume cost ledger balances to be correct without a fairly close verification.

5-142. The Work-in-Progress Inventory Sheet suggested provides for the cost ledger balances to be entered alongside the estimated values, and then for the value adopted for inventory purposes to be separately entered.

Under the scheme of works accounts laid down here, if properly administered, there should be little hesitation in accepting the cost ledger balances for the actual inventory values, provided that such figures in no case exceed the selling price after allowing for normal commercial expenses.

Valuation of Work-in-Progress.

The Work-in-Progress inventory should only include items of saleable product.

In detailing the stage in which the items of product are at the time of stocktaking, it will usually be feasible to compromise a little to simplify the pricing. Thus machined items may be taken as half-machined, quarter-machined and so on, rather than attempt to record all the gradations of machining that may occur. The extent of the compromise must depend obviously on the character of the work. All items should be weighed for checking the material valuation.

In making up the totals of the work-in-progress inventory, it is of much importance to make an adequate reservation for unmatured or unexpired liabilities in respect to guarantees applying to the product of the year, if the financial accounts are to represent the Company's true position.

Experimental orders in progress at the end of the financial year will be dealt with when settling the value to be carried forward on the Works Account Annual Abstract.

Loose Plant Valuation.

Section IV j

General Considerations.

IN considering the valuation of loose plant, some regard must be paid to the financial view-point, for in different works diametrically opposite methods of valuation evidently pass muster. In some cases, when the financial position is strong enough, no value whatever is placed on loose plant that has been put into use. In other cases, all loose plant is valued at cost, the argument being that while the items are good enough to use they are worth full value.

The more general practice, and the one followed by professional valuers, is to value loose plant that has been put into use at rates distinctly below original cost. These rates are applied frequently on a weight basis, thus milling cutters have been professionally valued at 4s. and 5s. per lb., forged steel spanners at 5d. per lb., taps at 2s. 6d. per lb., twist drills at 2s. 6d. per lb., automatic capstan lathe tools at 3s. and 4s. per lb., mild steel screw cramps at 4d. per lb., smiths' anvils at 16s. per cwt., and so on. New unused tools are almost invariably valued at cost.

A professional valuer must necessarily follow the general lines of established custom, using his discretion in each case as to the actual valuation rates to be used. Without disputing the acceptability of professional valuers' figures when available, it is necessary for works

General Considerations.

purposes to proceed on lines that are more amenable to routine treatment.

The most satisfactory and straighforward method is to price out the loose plant items at the replacement value and then to take a proportion of that value for inventory purposes. The reason for adopting replacement values as the basis values is to give the right perspective to the proposition. Generally speaking, the original cost, when known, may be accepted as the replacement value, but with plant made on the works, the original cost may exceed the replacement value, while the reverse may obtain in other cases.

The use of replacement values as basis values throughout the inventory makes possible various useful statistics for administrative purposes, including fire insurance, and also makes comparison possible from year to year, however much the inventory values may have been written down.

A conservative financial policy will aim at placing a minimum value on loose plant, as the break up price of same would be very small. Under such conditions the time will arrive when actual valuation of the loose plant each year is quite unnecessary, as being obviously above the certified value in the financial books. In such cases the departmental inventory may be reduced to such proportions as discipline and economy may dictate.

One serious objection to using replacement values throughout might be the excessive trouble in stocktaking necessary to ensure the individual descriptions being correctly given. In many cases of loose plant, the only ready method of stocktaking is by weight, and while this method is sometimes abused, it must be admitted for some items that have not been bought by weight. In those cases the replacement values should be converted to a weight basis, and probably averaged to an extent. Average replacement values may have to be adopted in other cases to obviate undue refinement in stocktaking, though the lines suggested for taking stock of loose plant lend themselves to a reasonable accuracy of description that will allow replacement values to be readily applied with considerable precision.

One rather useful application of these basis values lies in the practicability of demonstrating the departmental consumption of loose plant. This possibility may be taken advantage of to the extent of allowing foremen to report their own stock, so long as they are not posted as to the comparison figures. If the departmental stocks are priced out consistently each year on replacement values, and if the loose plant accounts, both additions and repairs, are kept under departmental heads, and these again under groups or classes of plant, the differences in terms of replacement value will give a very fair notion of what has actually taken place in each department.

Grouping of Loose Plant for Valuation.

Some recommendations are possible as to the groupings of loose plant calculated to serve the scheme proposed of appraising the plant on the basis of replacement value. It is, however, somewhat risky to suggest the definite proportions to be taken of those basis values, because the physical conditions of the plant and the financial condition of the Company must influence the actual decision.

In the following table the suggestions offered as to an inventory basis are by way of illustrating the scheme, and it must be borne in mind that a Company is at least at liberty to write down their loose plant to a breaking up price, which would be considerably less than the suggested formulas would give.

LOOSE PLANT GROUPINGS.	POSSIBLE INVENTORY, VALUATION BASIS.
1. Belting and Driving Ropes -	Replacement value, less 50 %.
2. Gauges and Mechanical Measuring Appliances—Standard	,, ,, ,, 33⅓ %.
3. Hand Tools—Engineers' -	,, ,, ,, 50 %.
4. Holding Appliances for Cutting Tools - - -	,, ,, ,, 33⅓ %.
5. Holding Appliances for Work -	,, ,, ,, 33⅓ %.
6. Machining Tools - - -	,, ,, ,, 33⅓ %.
7. Ordinary Implements and Utensils - - -	,, ,, ,, 50 %.
8. Portable Mechanical Appliances - - -	,, ,, ,, 33⅓ %.
9. Portable Shop Accessories -	,, ,, ,, 50 %.
10. Special Trade Tools and Accessories - - -	,, ,, ,, 50 %.
11. Testing Gear - - -	,, ,, ,, 50 %.
12. Transportation, Lifting and Weighing Apparatus - -	,, ,, ,, 33⅓ %.

It may with justice be argued that, in those groups, where few renewals have taken place in the course of the year, the inventory values of the previous year will not have been maintained, and, therefore, that the valuation scheme suggested above may not be always satisfactory. When, therefore, there is evidence that the plant under review is identical in the main with the previous year's stock, a deduction should be made for depreciation, after arriving at the inventory values on the regular lines. It should be remembered that average real values may have been in part maintained by the elimination of the more worn items by scrapping during the course

Grouping of Loose Plant for Valuation.

of the year. The comparison of the current inventory totals with the previous year's figures, in conjunction with the additions and renewal expenditure, will make this evident.

In settling the basis of inventory valuation to be adopted, it should be borne in mind that an actual inventory of stock in hand is under review, and that the wastage during the year does not enter into the question of inventory values, except as presumptive evidence that the average real value is being maintained.

Loose Plant Accounts.

In the matter of loose plant accounts the difficulty of discriminating with precision between additions and renewals will make it unsafe to place very much reliance on the additions figure except as it may be demonstrated by the annual inventory.

The inclusion of all belting and driving ropes in loose plant is not general practice, but is more satisfactory than charging the original belt for each machine to the cost of the installation, and charging all renewals to expense without recognising the peregrinations of belting in the course of its career. There are limits to tracing belts in their individual course, though much saving may result from the control exercised by statistics of this sort. It is sufficient from a works account point of view to record the existence of all belting available at the end of the year, whether running or lying idle, and this record will provide the necessary statistics of actual wastage during the year.

Other items of plant quite frequently included with machine values are attachments and accessories purchased with the machine. In the extreme case of a tool equipment bought with, say, a turret lathe, inclusion with the machine value is obviously a misleading practice, as the tools may disappear without any adjustment being made in the book value of the machine. There is the further question of depreciation, which is affected by combining loose plant with machine values. The course advocated is to consider as loose plant all attachments and accessories that are not integral parts of the machines, but are really extras that theoretically could be used generally, although in practice such items as faceplates may only be used on the machine to which originally fitted. The machine numbers may appear on such items without interfering with their inclusion in loose plant.

Motor Vehicles are included in Loose Plant (Group 12—Transportation Apparatus) on the grounds that depreciation is so rapid, and possibly uncertain, that yearly valuations are required.

Locomotives, on the other hand, are considered with Fixed Transportation Plant as being more amenable to an average rate of depreciation per annum.

Horses are included in Loose Transportation Plant, and valuation

Loose Plant Accounts.

should be based on a veterinary surgeon's report each year. Presumably, veterinary attendance during the year will be at a contract price per horse.

The sub-divisions of the Loose Plant Accounts should follow the grouping that is adopted for valuation purposes, with, possibly, separate accounts for each department under each heading.

Loose Plant Price Records.

5-143.

For valuation purposes, and to facilitate tracing the more expensive items in the inventory, a subsidiary set of price cards should be kept for each class. It may hardly be necessary to keep separate cards for each department possessing a given class of tools.

Data collected for fixing replacement values of old stock may conveniently be recorded on these cards, which, in being independent of the cost allocation accounts, will be available for inventory and reference purposes at all times.

Loose Plant Classification.

In view of the varied interpretation that may be placed on the group titles that have been suggested, it is thought desirable to give a representative list of items classified accordingly.

Loose Plant—Representative Classification.

1. *Belting and Driving Ropes.*

- Cotton Driving Ropes.
- Main Drive Belts.
- Machinery Belting, Canvas.
- Machinery Belting, Leather.
- Machinery Belting, Rawhide.

2. *Gauges and Mechanical Measuring Appliances—Standard.*

- Bevels.
- Calipers.
- Compasses
- Dividers.
- Gauges, Caliper and Snap.
- Gauges, Cylindrical.
- Gauges, Depth and Height.
- Gauges, Length.
- Gauges, Thread.
- Gauges, Wire and Sheet.
- Indicators, Measuring.
- Levels.
- Marking Out Tables.
- Measuring Machines.
- Micrometers.
- Plumb Bobs.
- Protractors.
- Rules, Standard and Contraction.
- Scribing Blocks.
- Squares.
- Straight Edges.
- Surface Plates and Tables.
- Tapes, Measuring.
- Test Bars.
- Trammels.
- Verniers.

3. *Hand Tools—Engineers.*

- Belt Cutters.
- Bolt Cutters.
- Centres and Centring Punches.
- Chisels.
- Drill Braces, Breast.
- Drill Braces, Ratchet.
- Files and Rasps.
- File Cards.
- File Handles.
- Hack Saws, Frames and Blades.
- Hammers, Copper and Lead.
- Hammers, Hand and Sledge.
- Lead Lumps.
- Mallets.
- Oilstones.
- Pincers.
- Pipe Cutters.
- Pipe Wrenches.
- Pliers and Wire Nippers.
- Punches.
- Reamers.
- Scrapers.
- Screwdrivers.
- Screw Plates.
- Spanners, Adjustable.
- Spanners, Plain.
- Stamps, Letter and Figure.
- Stocks and Dies.
- Stud Extractors and Stud Fixers.
- Taps.
- Tap Wrenches.
- Tommy Bars.
- Tube Cleaners.
- Tube Expanders.
- Wrenches, Pipe.

Loose Plant Classification.

Loose Plant—Representative Classification, contd.

4. *Holding Appliances for Cutting Tools.*

Arbors, Milling, Cutter and Reamer.
Bars, Boring and Cutter.
Boring Heads
Boring Tool Holders.
Chucks, Drill and Tool.
Collars for Arbors and Bars.
Press Tool Holders.
Sleeves, Taper.
Sockets, Taper.
Tapping Attachments.
Tool Holders for Bar Tools.
Tool Holders for Turrets.

5. *Holding Appliances for work.*

Angle Plates.
Balance Weights.
Bars and Sections.
Blocks, Packing.
Blocks, Vee.
Bolts, Nuts and Washers.
Chucks, Jaw.
Chucks, Magnetic.
Chucks, Plain and Ring.
Clamps and Cramps.
Collets, Spring.
Dividing Heads and Centres.
Dogs, Machine.
Drilling Posts and Knees.
Faceplates.
Gripping Dies.
Lathe Carriers.
Lathe Centres.
Lathe Steadies.
Mandrils, Expanding.
Mandrils, Plain.
Packing Pieces and Plates.
Screw Wedges.
Vices, Bench.
Vices, Hand.
Vices, Machine.
Vices, Pipe.
Vice Clams.
Wedges.

6. *Machining Tools.*

Bar Tools (Lathe, Planers, etc.), Carbon Steel.
Bar Tools (Lathe, Planers, etc.), High Speed Steel.
Boring Tools, Lipped.
Broaches.
Centre Drills.
Chasers.
Counter Bores and Facing Tools.
Cutters, Flat (for Cutter Bars and Tool Holders).
Drills, Flat.
Drills, Twist.
Gear Cutters.
Grinding Wheels.
Grinding Wheel Dressers.
Knurling Tools.
Marking Rollers.
Milling Cutters, Form.
Milling Cutters, Plain.
Press Tools.
Reamers.
Saws, Band.
Saws, Circular.
Screwing Dies.
Screwing Die Heads.
Taps.
Threading Tools.

7. *Ordinary Implements and Utensils.*

Baskets.
Bellows.
Brooms and Mops.
Brushes.
Buckets.
Canvas Covers.
Casks.
Crowbars.
Drip Cans.
Drums.
Filters, Oil.
Filters, Water.
Forks.
Funnels.
Goggles.
Ladders.
Lamps, Flare.
Lamps, Hand.
Long Arms.
Mats.
Measures, Liquid.
Nail Extractors.
Oil Bottles and Cans.
Oil Feeders.
Oil Skins.
Padlocks.
Paint Kettles.
Picks.
Poles, Hand.
Rakes.
Riddles.
Sacks.
Shovels.
Sieves.
Sign Markers.
Sponges.
Squeegees.
Stencils.
Steps.
Suds Tins.
Syringes.
Tarpaulins.
Torches, Electric.
Watering Cans.

8. *Portable Mechanical Appliances.*

Boring Apparatus.
Drills, Electric.
Flexible Shafts and Tools.
Grinders, Electric.
Pneumatic Hammers.
Presses, Arbor and Straightening.
Pumps, Lifting.

9. *Portable Shop Accessories.*

Ambulance Appliances.
Boards, Setting out.
Boards, Shop Print.
Boards, Tally.
Boshes.
Boxes.
Desks, Shop.
Fire Fighting Appliances.
Horses, Steel.
Hose.
Lockers, Workers'.
Mess Room Fittings.
Pans and Trays.
Planks.
Racks.
Screens and Barriers.
Stands, Hat and Coat.

Loose Plant Classification.

Loose Plant—Representative Classification, contd.

- Stands, Vice.
- Stands, Wash.
- Stands, Work and Tool.
- Stools.
- Tables.
- Tool Boxes.
- Tool Cupboards.
- Trestles.

10. *Special Trade Tools and Accessories.*

Building— Sundry Tools and Accessories.

Electricians'— Sundry Tool and Accessories.

Heat Process— Blow Lamps.

Pertaining to Coppersmiths, Foundries, Smithy, Tinsmiths, etc.
- Blow Pipes.
- Firing Tools.
- Forges and Furnace, Portable.
- Ladles.
- Melting Pots.
- Moulds, Ingot.
- Moulding Boxes.
- Pots, Hardening and Case Hardening.
- Soldering Irons and Bits.
- Sundry Tools and Accessories.

Metal-Working— Anvils.

Pertaining to Boilermakers, Coppersmiths, Smithy, Tinsmiths, etc.
- Blocks and Plates, Setting and Flanging.
- Caulking Tools.
- Crease Irons.
- Dollies.
- Drifts.
- Folders, Tinman's.
- Hammer Tools.
- Levelling Slabs.
- Mandrils, Tinman's.
- Rivetting Tools.
- Setts.
- Shears, Hand.
- Shears, Tinman's.
- Stakes.
- Stamping Dies.
- Sundry Tools and Accessories.
- Swages and Swage Blocks.
- Tongs.

Painting— Brushes.
- Spraying Machines.
- Sundry Tools and Accessories.

Polishing— Bobs and Mops.
- Sundry Tools and Accessories.

Woodworking— Hand Tools.
- Machine Bits.
- Machine Knives.
- Saws, Band.
- Saws, Circular.
- Trimmers.
- Vices.

11. *Testing Gear.*

- Ammeters.
- Ballast Weights.
- Barometers.
- Calorimeters.
- Cocks.
- Counters.
- Engine Indicators.
- Flanges.
- Galvanometers.
- Hardness Testing Instruments.
- Jointing Materials.
- Manometers.
- Ohmeters.
- Pipes.
- Pressure Gauges.
- Pumps, Portable Pressure.
- Pyrometers.
- Salinometers.
- Speedometers.
- Springs.
- Tachometers.
- Thermometers.
- Tubing, Rubber.
- Tubing, Flexible Metallic.
- Valves.
- Volt Meters.
- Watches, Stop.

12. *Transportation, Lifting, and Weighing Apparatus.*

- Barrows.
- Blocks, Chain.
- Blocks and Falls, Rope.
- Chains and Chain Slings.
- Cords.
- Crane Hooks and Shackles.
- Hand Carts.
- Horses.
- Horse Carts and Vans.
- Jacks, Hydraulic.
- Jacks, Screw.
- Lifting Dogs.
- Lifting Screws.
- Motor Cars.
- Motor Vans.
- Packing Cases.
- Ropes, Hemp and Manilla.
- Ropes, Wire.
- Scales and Balances.
- Steam Wagons.
- Tongs, Lifting.
- Tongs, Timber.
- Trolleys, Hand Sack.
- Trolleys, Flat.
- Trucks and Wagons.
- Weighing Machines, Counter.
- Weighing Machines, Crane.
- Weighing Machines, Platform.

It is suggested that a classification list on the lines just indicated should be prepared, suited to the works in question, and revised editions issued each year to the departmental foreman and others for guidance at stocktaking. For this purpose it is important that the

Loose Plant Classification.

character of information required for valuation purposes, in respect to each class, should be indicated on the list. The following gives the range of data likely to be called for :

Weight	Wt.	Material	Ml.
Number or quantity	No.	Maker's Mark or Nominal Size	Mk.
Individual description	Dn.	Maker's or Supplier's Name	Mr.
Length	Ln.	Principal Sizes	Sz.

Abbreviations of the sort given are more readily remembered than single symbol letters.

For reference purposes generally it will be found distinctly advantageous to number the classes. Class numbers may be conveniently derived by combining the group number with the sequence number in the group as 1/4, 2/12, etc., and this will help the cost allocation work when the combined group and item number is quoted on the
5-59. Tool Sub-Orders.

Office Equipment Classification.

A fairly representative list of office equipment items is appended, although there are no group titles to be amplified, as the sub-dviision possible under office fittings, office furniture, and office accessories is rarely necessary.

Office Equipment—Representative Classification.

Book Cases and Cupboards.
Books, Ready Reckoners.
Books, Technical Reference.
Books, Trade Reference.
Calculating Machines.
Card Cabinets.
Chairs and Stools.
Cheque Perforators.
Clocks.
Coin Sorting Apparatus.
Copying Apparatus.
Desks.
Dictating Machines.
Drafting Machines.
Drawing Boards and Tee Squares.
Drawing Cases.
Drawing Instruments.
Drawing Tables.
Duplicators.
Filing Appliances.
Floor Covering.
Letter Opening Machines.
Maps.
Minor Office Accessories.
Models and Samples for Exhibition Purposes.
Numbering Machines.
Photo Printing Machines.
Picture Frames.
Portable Fans.
Safes and Cash Boxes.
Scales.
Show Fittings.
Slide Rules.
Stamp Affixing Machines.
Surveying Instruments.
Tables.
Telephone Recording Appliances.
Typewriters.
Watchmen's Tell Tales.
Writing Utensils.

Section IV k

Buildings and Fixed Plant Valuation.

General Considerations.

THE task of valuing the buildings and fixed plant of any works is not usually dealt with by the Works staff, except to the extent of keeping careful accounts of expenditure and depreciation. When

General Considerations.

any occasion arises to necessitate a confirmation of the book values, professional valuers are usually called in and only their certificate is likely to be held valid in any financial transactions involving the plant values.

Without suggesting restrictions to the field of professional valuations, there will be, in any fully organised works, a need for a valuation to be carried out for works account purposes which, both economy and convenience suggest, should be done mainly by the Works Staff.

The usual difficulty in applying professional valuations for works account purposes is in the lack of detail figures from which departmental values can be derived. There are professional engineers who undertake the preparation of inventories and valuation of plant in full detail, but this course is not usual for valuations used for financial deals.

The professional report will include probably an excellent description of the items included in the valuation, but no values, except as to totals under a few main headings. The existence of complete plant accounts should influence the headings selected by the valuer and thus make his report of the more use for works accounts.

In preparing for a works valuation, the works accounts should be previously organised on lines that will accord with those to be adopted in the inventory, and this will facilitate the adjustment of valuation afterwards, from year to year, with a minimum of further inventory.

Buildings and Fixed Plant Cost Accounts.

So far as the necessary plant cost accounts are concerned, the list of representative standing orders, already given, being designed to provide suitable headings for valuation purposes, as well as for shop charge purposes, fixes the range of cost accounts in this connection.

The headings may conveniently be set out again here, the standing order references being omitted.

Land and buildings.
Motive Power Plant.
Mechanical Transmission.
Electrical Transmission.
Pipe Transmission.
Transportation Plant.
Shop Fixtures.
Special Process Plant.
Machines.

A list of representative items falling under these headings is given further on.

In regard to the provision, by the works accounting system, for adjusting valuation figures from year to year, the essential point is to regularise all expenditure pertaining to buildings and fixed plant so that not only can efficient control be exercised, but the scope and

Buildings and Fixed Plant CostAccounts

effect of each item of expenditure shall also be made clear and allocated accordingly.

It is difficult to avoid the conclusion that costing systems that are not subject to very much more consideration than is usual in this connection, will not give reliable figures as to the value of Works Additions. There will be inconsistency as to the treatment of renewals and there will be confusion when extensive alterations are made.

As a matter of fact, the net effect of Works alterations on capital values cannot be determined very definitely in advance, and the only safe way is to suspend judgment until the work is finished. The function of the works accounts becomes then limited, to an extent, to providing the data for the final allocation of the costs of alterations, rather than to give in the first instance the requisite figures as to capital values.

The scheme of accounts advocated involves the issue of specific
5·96. Plant Sub-Orders for each item of Works Additions, Renewals and Alterations not obviously repairs, under a special reference letter, say " N." Each " N " Order is subject to review on the completion of the work, and, if necessary, transfer made to the expense standing orders of those costs that scrutiny shows to be not of the nature of an addition to capital value.

A separate standing order (S 2-6) is provided for Plant Removals and Alterations, chargeable to current expense, to avoid inflating the repair accounts.

Ordinary repair items are dealt with under another series reference letter, say " R."

Concurrently with the transfer to works expenses of any " N " Order Costs that are not capital additions, the costs that have properly to be recorded in the financial accounts as works additions are entered in the works accounts under the respective standing orders. The actual holding in suspense, as to final allocation of " N " order costs will not, in practice, involve very many orders, but the principle of scrutinising each item, before passing it as a capital addition, is entirely sound. This scrutiny is supposed to be made on each fort-
5·137. night's accounts as set out on the Plant Sub-Orders Cost Summary, while the facts of each case are clear in the Works Manager's mind.

As previously discussed, Works Additions values are taken for financial account purposes at the cost of material, disbursement and wages only, shop charges not being admitted in this connection as a measure of precaution against over-valuation.

The point as to including belting and machine accessories with loose plant rather than fixed plant has been discussed in the preceding section.

Discarded Plant.

In the matter of plant that is discarded, care must be taken to correct the book values of the plant in the financial accounts.

The scrap value of discarded plant should obviously be credited to the capital values, and when the discarded plant is sold, this course is taken as a matter of course. A credit entry is made against the respective Works Additions Standing Order of an amount corresponding to the debit placed against the Sales Sundries Order covering the sale of the plant.

Discarded plant is not always sold, and sometimes is utilised for repair purposes or incorporated in some new construction. This occurs particularly with dismantled buildings. To meet such cases a standing order for Discarded Plant Stock Values (U 3-5) is necessary, thus allowing the capital value of the plant generally to be reduced accordingly, and for the scrap values in question to be held in suspense pending the utilisation of the discarded plant.

If the unsold discarded plant is utilised, say, for a repair job, the Plant Order for the repair should be debited and Standing Order U 3-5 credited. It may not, however, pay to follow very closely the utilisation of discarded plant, except on the bigger jobs.

At the end of the year any unsold discarded plant still in stock will be reported accordingly, and the balance, if any, against the account (representing the discarded plant that has been utilised or disposed of without any account adjustment being made) must be transferred to the Shop Charges Supplementary Account.

It will usually happen that when plant is discarded the capital value in the books will differ from the scrap value, and such difference is best dealt with as extra depreciation, to be noted in the Shop Charges Book and duly reported at the end of the year. This point is referred to again in connection with Depreciation.

Method of taking Inventory.

In the actual taking of the works inventory the person told off to the duty should be very methodical and of considerable technical experience, and beyond that, should give his whole time to it until through with the work.

It will be a distinct aid if the works plans are previously brought thoroughly up to date. The preparation of proper works plans, giving not merely machine locations but also pipe service, lighting service systems, etc., is to be recommended for efficient administration, apart from all questions of valuation—separate prints being used for each service system.

Incidentally the use of specific Plant Sub-Orders for all additions, renewals, alterations and removals makes it possible to keep the works plans up to date with trifling expense, providing there is a rigid application of the scheme of Plant Orders.

Method of taking Inventory.

The Works Valuer, to coin a temporary name, can hardly be qualified to deal with land and buildings.

In the case of land, there is little alternative to calling in a professional land surveyor or valuer, and yet his report will probably contain so many qualifications that his personal judgment is really the deciding factor. It might not be difficult to get widely varying values from different surveyors. The surveyor's report on the land is likely to be of considerable permanent service, even if his judgment as to the land value be disputed.

In the matter of buildings, a skeleton inventory can be prepared and a local builder with a fairly intimate knowledge of the site called in to give the replacement values or estimated cost of replacement of each building.

These replacement values should be compared with the data available as to original costs. If such data were always entirely reliable, the precaution of obtaining an independent estimate would be the less imperative. It is suggested that the current value of a building should be estimated by the process of depreciation of the original value.

The Works Valuer will find it of considerable help to have the services of a very intelligent shorthand clerk to go round the Works with him to take down particulars. The necessity of avoiding any mistakes in taking the inventory detail down will be obvious.

In the matter of certain groups of plant it will be much more satisfactory for the inventory to be taken in the first instance by the particular men whose business it is to keep the particular plant in order, providing that they are accompanied by the Works Valuer's Clerk to take down the data in good order. The groups where this course will be desirable are as follows :

Mechanical Transmission (Millwright).
Electrical Transmission (Electrician).
Pipe Transmission (Pipe Fitter).
Shop Fixtures (Joiner).

In the above cases the inventory will be very much simplified, and the net results not the less satisfactory, if the practice is adopted, in estimating original values, of adding a margin to the material costs to cover installation and connections. It is necessary to go to a little trouble to see what this margin amounts to in typical instances of each class of plant. If the margin is expressed in terms of cost per foot run, etc., rather than as percentage of cost, in the case of shafting, piping, wiring, etc., graded as to different sizes, the rate to be allowed will be more easily arrived at and more easily applied.

The operation of depreciation will steadily minimise any errors in arriving at original values, and the exercise of discretion in the method of taking the inventory of minor details of plant is the more admissible in consequence.

It is, however, quite easy to go a good deal wrong over details that are small in themselves, but occur so frequently as to account for a considerable value in the bulk.

Method of Taking Inventory

In taking the inventory, the age of each item requires to be noted, and this should be obtained from the shop staff, if not available from official records. The opportunity should be taken of commenting on the probable further life of each item, more particularly as to the likelihood of early obsolescence or supercession by more modern plant.

The inventory data should be finally entered on suitable cards. 5-64.

Valuation.

The basis recommended for valuing purposes is the original value or the replacement value, whichever may be the lower. The current or inventory value is then arrived at by depreciation according to the age of the item—the depreciation rate being settled in accordance with the probable life of the class of plant in question.

It is not saying too much to state that the cost data of work done on the factory in years gone by is very liable to be wrong, and, whether wrong or right, it is very much safer to value on the basis of what the buildings and plant ought to have cost rather than what they are purported to have cost. Another factor tending to prevent the use of cost data is that the classification adopted for a works valuation, on the lines discussed, is hardly likely to have been anticipated in the cost accounts of a much earlier date.

A yet further point is that the cost of alterations may have been added to the book value of the plant in the past without permanently increasing the real capital value. The replacement value comparison will correct these inflations of book value so far as they may be wrong.

The use of replacement values gives a common ground of reference in criticising the ultimate inventory values, and furnishes also an important guide to the values to be covered under the fire insurance policies, for book values may, if much written down, be dangerously misleading.

Having arrived at proper basis values, the next step is to consider at what rate per annum depreciation should be allowed for. Assuming that the rate of depreciation has been decided upon in each case, the procedure as to inventory value means deducting from the replacement value the accumulated depreciation to date.

The generally accepted method of depreciation plant values is by a regular percentage deduction each year of life, from the diminishing value of the item, so that it is not quite a simple matter to calculate the total depreciation for a given number of years. For inventory purposes the reverse information has to be recorded, viz., the present or remainder value, and it is convenient to have reference tables showing the remainder values in terms of percentages of the original or reference value. A table is included here for this purpose.

Valuation.

Depreciation by percentage on Diminishing Values. Table of Remainder Values expressed as percentage of Original Value.

Number of Years.	PERCENTAGE DEPRECIATION PER ANNUM.						
	2½ per cent.	3 per cent.	4 per cent.	5 per cent.	6 per cent.	7½ per cent.	10 per cent.
1	97·50	97·00	96·00	95·00	94·00	92·50	90·00
2	95·06	94·09	92·16	90·25	88·36	85·56	81·00
3	92·69	91·27	88·47	85·74	83·06	79·15	72·90
4	90·37	88·53	84·93	81·45	78·07	73·21	65·61
5	88·11	85·87	81·54	77·38	73·39	67·72	59·05
6	85·91	83·30	78·28	73·51	68·99	62·64	53·14
7	83·76	80·80	75·14	69·83	64·85	57·94	47·83
8	81·67	78·37	72·14	66·34	60·96	53·60	43·05
9	79·62	76·02	69·25	63·02	57·30	49·58	38·74
10	77·63	73·74	66·48	59·87	53·86	45·86	34·87
11	75·69	71·53	63·82	56·88	50·63	42·42	31·38
12	73·80	69·38	61·27	54·04	47·59	39·24	28·24
13	71·95	67·30	58·82	51·33	44·74	36·29	25·42
14	70·16	65·28	56·47	48·77	42·05	33·57	22·88
15	68·40	63·32	54·21	46·33	39·53	31·05	20·59
16	66·69	61·43	52·04	44·01	37·16	28·73	18·53
17	65·02	59·58	49·96	41·81	34·93	26·57	16·68
18	63·40	57·79	47·96	39·72	32·83	24·58	15·01
19	61·81	56·06	46·04	37·74	30·86	22·73	13·51
20	60·27	54·38	44·20	35·85	29·01	21·03	12·16
21	58·76	52·75	42·43	34·06	27·27	19·45	10·94
21·9	—	—	—	—	—	—	*10·00*
22	57·29	51·17	40·73	32·35	25·63	17·99	9·85
23	55·86	49·63	39·11	30·74	24·10	16·64	8·86
24	54·46	48·14	37·54	29·20	22·65	15·40	7·98
25	53·10	46·70	36·04	27·74	21·29	14·24	7·18
26	51·77	45·30	34·60	26·35	20·01	13·17	6·46
27	50·48	43·94	33·21	25·03	18·81	12·18	5·81
28	49·22	42·62	31·89	23·78	17·68	11·27	5·23
28·4	—	—	—	—	—	—	*5·00*
29	47·99	41·34	30·61	22·59	16·62	10·43	
29·5	—	—	—	—	—	*10·00*	
30	46·79	40·10	29·39	21·46	15·63	9·64	
31	45·62	38·90	28·21	20·39	14·69	8·92	
32	44·48	37·73	27·08	19·37	13·81	8·25	
33	43·37	36·60	26·00	18·40	12·98	7·63	
34	42·28	35·50	24·96	17·48	12·20	7·06	
35	41·22	34·44	23·96	16·61	11·47	6·53	
36	40·19	33·40	23·00	15·78	10·78	6·04	
37	39·19	32·40	22·08	14·99	10·13	5·59	
37·2	—	—	—	—	*10·00*	—	
38	38·21	31·43	21·20	14·24	9·52	5·17	
38·3	—	—	—	—	—	*5·00*	
39	37·25	30·49	20·35	13·53	8·95		
40	36·32	29·57	19·54	12·85	8·42		
41	35·42	28·68	18·75	12·21	7·91		
42	34·53	27·82	18·00	11·60	7·44		
43	33·67	26·99	17·28	11·02	6·99		
44	32·82	26·18	16·59	10·47	6·57		
44·9	—	—	—	*10·00*	—		
45	32·00	25·39	15·93	9·94	6·18		
46	31·20	24·63	15·29	9·45	5·81		
47	30·42	23·89	14·68	8·97	5·46		
48	29·66	23·18	14·09	8·53	5·13		
48·4	—	—	—	—	*5·00*		
49	28·92	22·48	13·53	8·10			
50	28·20	21·81	12·99	7·69			
51	27·49	21·15	12·47	7·31			
52	26·81	20·52	11·97	6·94			
53	26·14	19·90	11·49	6·60			

Valuation.

Depreciation by percentage on Diminishing Values. Table of Remainder Values expressed as percentage of Original Value.

Number of Years.	PERCENTAGE DEPRECIATION PER ANNUM.						
	2½ per cent.	3 per cent.	4 per cent.	5 per cent.			
54	25·48	19·30	11·03	6·27			
55	24·85	18·73	10·59	5·95			
56	24·22	18·16	10 17	5·66			
56·4	—	—	*10 00*	—			
57	23·62	17·62	9·76	5·37			
58	23·03	17·09	9·37	5·10			
58·4	—	—	—	*5·00*			
59	22·45	16·58	8·99				
60	21·89	16·08	8·64				
70	16·99	11·86	5·74				
73·4	—	—	*5·00*				
75·6	—	*10·00*					
80	13·19	8·74					
90	10·24	6·45					
90·9	*10·00*	—					
98·2	—	*5·00*					
100	7·95						
118·3	*5·00*						

Number of Years.	PERCENTAGE DEPRECIATION PER ANNUM.						
	12½ per cent.	15 per cent.	20 per cent.	25 per cent.	30 per cent.	33⅓ per cent.	40 per cent.
1	87·50	85·00	80·00	75·00	70·00	66·67	60·00
2	76·56	72·25	64·00	56·25	49·00	44·44	36·00
3	66·99	61·41	51·20	42·19	34·30	29·63	21·60
4	58·62	52·20	40·96	31·64	24·01	19·75	12·96
4·5	—	—	—	—	—	—	*10·00*
5	51·29	44·37	32·77	23·73	16·81	13·17	7·78
5·7	—	—	—	—	—	*10·00*	—
5·9	—	—	—	—	—	—	*5·00*
6	44·88	37·71	26·21	17·80	11·76	8·78	
6·5	—	—	—	—	*10·00*	—	
7	39·27	32·06	20·97	13·35	8·24	5·85	
7·4	—	—	—	—	—	*5·00*	
8	34·36	27·25	16·78	10·01	5·76		
8·0	—	—	—	*10·00*	—		
8·4	—	—	—	—	*5·00*		
9	30·07	23·16	13·42	7·51			
10	26·31	19·69	10·74	5·63			
10·3	—	—	*10·00*	—			
10·4	—	—	—	*5·00*			
11	23·02	16·73	8·59				
12	20·14	14·22	6·87				
13	17·62	12·09	5·50				
13·4	—	—	*5·00*				
14	15·42	10·28					
14·2	—	*10·00*					
15	13·49	8·74					
16	11·81	7·43					
17	10·33	6·31					
17·3	*10·00*	—					
18	9·04	5·36					
18·4	—	*5·00*					
19	7·91						
20	6·92						
21	6·06						
22	5·30						
22·4	*5·00*						

Valuation.

The use of the table is fairly obvious, but an illustration may be useful.

Suppose the original value of a lathe, 14 years old at date of inventory, is taken at £150 and the rate of depreciation is taken at 6 per cent. Turning to the tables, it will be seen that the remainder value after 14 years at 6 per cent. depreciation will be 42.05 per cent. of the original value, that is, the inventory value of this lathe at the date of the inventory will be 42.05 per cent. of £150, which equals £63 1s. 6d.

The form of the inventory will need to be such as to give the departmental values under the respective group headings.

The application of these departmental values and item values for shop charges purposes has been already explained, and no suggestion can, of course, be made as to what is to happen if the total inventory value proves to be considerably less than the total book value, as is likely to be the case. The use of what may be termed approved original values rather than unverified cost data as the basis value, will by itself tend to a lower inventory value, particularly as regards installation values, because works labour of this sort is almost inevitably out of proportion to the tangible results, and only tangible results can be admitted in a valuation on the present lines. The non-recognition of shop charges in connection with works labour is intended to prevent the cost basis giving an over-valuation.

Another, and possibly more influential factor, is the probable difference between the depreciation rates that a technically trained man acting as Works Valuer, with full cognisance of the facts, will use for inventory purposes, and those that will have obtained in connection with the financial accounts. The Works Manager, rather than the Works Valuer, will be required to take the responsibility for the depreciation rates used, but the Works Valuer will presumably be competent to recommend appropriate rates. The Works Manager will be able to test the suitability of the depreciation rates by noting a number of the inventory values and inspecting the plant in question to see what evidence is available to confirm the line taken.

A works valuation carried out conscientiously on these lines will afford the only practicable method of testing the adequacy of the depreciation rates used in the financial accounts.

Depreciation Rates.

Coming to the question of depreciation rates, this is a matter that can only be handled at all here by admitting, at the start, that each factory stands alone as to what are proper and adequate depreciation rates to apply.

As a matter of valuation, considerable discrimination can be used

Depreciation Rates.

as to the depreciation rates applicable to particular items, having regard to all the facts of the case. From the financial accounting point of view there is, however, no satisfactory alternative to the use of average rate, graded to an extent according to the classes of plant involved. The plant groupings already given recognise these limitations and are arranged to minimise the misleading effect of average rates. Even if the depreciation rates were further graded to suit each class of plant included in these groups, they would still fail to discriminate between the wear and tear of the different items in each class, due to different conditions of service and the varying endurance of different types and makes. There is, therefore, little encouragement to consider the increased accounting work necessary to carry out such an idea.

Only a few well-defined groups of plant values can be accepted in the financial books, not so much from a book-keeping point of view as from the all-important one of the decision to be arrived at by the Directors as to the depreciation rates to be used for each group of plant. In this connection the lines of treatment will be necessarily broad, to conform with the principles common to all business enterprises.

The Works Manager will be enabled after a works valuation to make important recommendations to the Directors as to the proper rates of depreciation.

While the risk of obsolescence before plant is worn out may be a very serious one, it involves taking a rather too heroic course to depreciate heavily on this account. The better compromise will be to reckon on dealing with the book value of each item of plant when the occasion arises to replace it. Such difference as is found to exist between the book value and the value realisable by the sale of the discarded plant, may be considered as the balance of depreciation for which the annual rates have not provided.

This difference of extra depreciation will require to be specially reported at the end of the year for incorporation in the financial accounts. In the representative classification of buildings and fixed plant given further on, the opportunity has been taken to make some suggestions as to depreciation rates. Provisional annual rates of depreciation have been indicated against each class. The rates are quite tentative and assume favourable conditions all round. The average profitable life of the respective items is assumed to be reached when the book value has been reduced to ten per cent. of the original value ; while the average possible life is assumed to be reached when the book value has been reduced to five per cent. of the original value, by the application of the given annual percentage rates to the remainder values. (See footnote, p. 375.)

Depreciation Rates. To enable the provisional rates given to be considered more critically, the classification table gives in parallel the years necessary to reach ten per cent. and five per cent. respectively of the original value. Viewed in this way the table will be useful in settling the rates appropriate to a given factory, without necessarily involving acceptance of any of the rates suggested.

It is usual to consider that the average scrap value of plant is five per cent. of the original value, but if the plant is not fully worn out when the book value has reached ten per cent. of the original value, and is only discarded in favour of more modern plant, there is a reasonable expectation of realising more than scrap value for the discarded plant. When the book value cannot be recovered in this way the difference is dealt with as already discussed.

As previously remarked, the operation of obsolescence cannot be foreseen and must be met as occasion demands.

With the best part of the industrial world concentrating on economies in production, obsolescence of factory equipment tends to become increasingly rapid, while the stress of competition in the future will force general recognition of the fact even more than it does to-day, although as efficiency increases each succeeding advance is more difficult of attainment. These are considerations to be carefully weighed in fixing depreciation rates, and when in doubt, the rate should be on the high side, as the lower the book value of any plant item the more readily can Directors sanction the substitution of improved plant.

To avoid misconstruction, it must be clearly understood that the annual depreciation rates suggested in the classification table do not attempt to provide for obsolescence.

In a factory run at high pressure, wear and tear must take place the more rapidly, and will call for an annual consideration of the depreciation to be provided above the normal rate adopted.

When the factory is built on leasehold land, the question of depreciation assumes a different aspect and calls for legal advice as to the sum to be provided over the period of the particular lease in question to counterbalance the expiration of values that pass on the determination of the lease. This amortization, as it is called, of the lease may be achieved by the payment of annual premiums under a suitable insurance policy, just as is done sometimes for the redemption of Debentures.

Buildings and Fixed Plant Register. Apart from the data as to building and fixed plant items available from the cost accounts, it is convenient to keep an independent 5·145· Buildings and Fixed Plant Register. In this register should be recorded the capital value of any additions and alterations, the inventory value whenever taken, and the book or remainder value at any date for which the figures may be desired. In the ordinary way, if average depreciation rates are used, there is little occasion to make entries each year in the Plant Register in respect to the annual depreciation. By the use of the Remainder Value tables, one calculation will serve to give the remainder value after any term of years.

Buildings and Fixed Plant Register.

Touching the provision suggested for inventory value it may be worth while, if a thorough works valuation at one time is out of the question, to value the plant by instalments. The location of the plant at the time of inventory may conveniently be indicated in the register, and it would be worth while re-valuing the individual items whenever the location is altered.

Building and Fixed Plant Classification.

Groupings of plant have already been suggested for accounting purposes. It is necessary not only to define the classes included in each group, but also to provide for the identification of each item of plant and each building throughout the factory, so that there may be no question to which items the various Plant Sub-Orders apply, and to provide simple symbols for referring in the production records to the machines used.

A representative classification is given accordingly, and convenient class numbers may be evolved from the group numbers by using the group number to represent the hundreds figure and the class sequence in the group to represent the tens and units figure. Thus Accumulators, Hydraulic would be class 201 and Shaping Machines would be class 987. This assumes that there will be no more than 99 classes in any one group, and this is a reasonable assumption for the majority of works.

The identification number for each item of a given class can very well be the sequence number as taken up in the Plant Register in conjunction with the class number, *e.g.* 215/1, 215/2, etc. A scheme of this sort helps in the allocation of costs, as the group number (or first figure of class number) corresponds with the standing order sequence numbers; thus Repair Costs on Accumulator No. **2**01/1 will be allocated to Standing Order R 2/**2**, and Repairs to Shaping Machine No. **9**87/21 to R 2/**9**.

In the foregoing discussion on depreciation rates and the table following, regard has been paid only to the method of depreciating by percentages of the remainder values. An alternative method is to depreciate by percentages of the original values, giving an equal charge for each year of the machine's life. The percentage-of-remainder-value system entails a heavier burden in the earlier years of the machine's life, and a proportionately lighter burden in the later years when repair expenses will increase.

Building and Fixed Plant Classification.

Buildings and Fixed Plant—Representative Classification.

	Prov. Dep. %	Years. 10%	Years. 5%
1. *Land and Buildings.*			
Buildings — Substantial Brick, Reinforced Concrete, and Steel Framed.			
When used for ordinary trades, *e.g.* Machine Shop	2½	91	118
When used for destructive trades, *e.g.* Smithy.	4	56	73
Buildings, Iron, Substantial.			
Ordinary trades.	4	56	73
Destructive trades.	7½	29	38
Buildings, Iron, Light.	10	22	28
Chimney Shafts, Brick.	4	56	73
Chimney Shafts, Steel.	7½	29	38
Drainage System.	Land	—	—
Fencing.	4	56	73
Floor Plates.	6	37	48
Foundations for Machinery	Mach.	—	—
Gauntries for Cranes.	Bldg.	—	—
Land.	—	—	—
Lightning Conductors.	Bldg.	—	—
Railway and Tramway Tracks.	4	56	73
Roads.	Land	—	—
Sash Operating Apparatus	Bldg.	—	—
Sign Boards.	15	14	18
Wells, Artesian.	Land	—	—
Wharves.	2½	91	118
2. *Motive Power Plant.*			
Accumulators, Hydraulic.	6	37	48
Ash Handling Plant.	10	22	28
Boilers, Lancashire Type.	7½	29	38
Boilers, Heating.	15	14	18
Boilers, Water Tube.	12½	17	22
Boosters.	7½	29	38
Coal Handling Plant.	10	22	28
Compressors, Air.	7½	29	38
Compressors, Centrifugal.	7½	29	38
Condensers, Evaporative.	7½	29	38
Condensers, Jet & Surface	7½	29	38
Cooling Towers.	7½	29	38
Draught Installation, Forced and Induced.	7½	29	38
Economisers, Fuel.	7½	29	38
Ejectors.	12½	17	22
Engines, Blower & Pumping.	6	37	48
Engines, Gas and Oil.	7½	29	38
Engines, Portable.	7½	29	38
Engines, Steam.	7½	29	38
Gas Producer Plant.	7½	29	38
Generators, Electric, Alternators.	7½	29	38
Generators, Continuous Current (Dynamos).	7½	29	38
Generators, Turbo.	7½	29	38
Heaters, Feed Water.	7½	29	38
Injectors.	12½	17	22
Motors, Electric.	7½	29	38
Motor Stands.	6	37	48
Oil Fuel Apparatus.	12½	17	22
Power Plant Pipes.	7½	29	38
Pumps, Air.	7½	29	38
Pumps, Centrifugal and Turbine.	7½	29	38
Pumps, Hydraulic.	6	37	48
Pumps, Steam.	7½	29	38
Steam Separators & Traps.	7½	29	38
Stokers, Mechanical.	12½	17	22
Superheaters.	12½	17	22
Transformers & Converters.	7½	29	38
Turbines, Steam.	7½	29	38
Turbines, Water.	7½	29	38
Water Cooling Plant.	7½	29	38
Water Purifying and Softening Apparatus.	7½	29	38

	Prov. Dep. %	Years. 10%	Years. 5%
2. *Motive Power Plant, contd.*			
Water Towers.	7½	29	38
Water Wheels.	6	37	48
3. *Mechanical Transmission.*			
Chain Transmission.	7½	29	38
Clutches.	7½	29	38
Gearing, Toothed.	7½	29	38
Shafting (including Pulleys, Bearings and Supports).	7½	29	38
4. *Electrical Transmission.*			
Batteries, Storage.	12½	17	22
Cables.	6	37	48
Switchboards, Distribution Boards and Fittings.	7½	29	38
Bells and Signals.	7½	29	38
Light, Wiring and Fittings.	7½	29	38
Motor Rheostats and Switches.	7½	29	38
Telephone Installation.	7½	29	38
5. *Pipe Transmission.*			
Blast Pipe Installation.	7½	29	38
Blowers.	7½	29	38
Dust Extracting Installation.	7½	29	38
Fans, Blast.	6	37	48
Fans, Exhaust & Ventilating.	6	37	48
Fire Hydrants, Valves and Pipes.	6	37	48
Gas Lighting, High Pressure Installation.	15	14	18
Gas Mains, Meters, Piping, and Valves.	6	37	48
Heating Pipes, Radiators and Valves.	10	22	28
Hydraulic Piping.	7½	29	38
Petroleum and Petrol Storage Installation.	10	22	28
Soda Kettle Installation.	10	22	28
Sprinkler Installation.	6	37	48
Suds Installation.	7½	29	38
Tanks.	10	22	28
Ventilating and Exhausting Installation.	7½	29	38
Water Supply Pipes and Connections.	7½	29	38
6. *Transportation Plant.*			
(Including Weighbridges.)			
Conveying Machinery.	7½	29	38
Cranes, Jib & Travelling.	7½	29	38
Cranes, Loco. & Portable.	7½	29	38
Hoists, Chain.	7½	29	38
Hoists, Pneumatic.	12½	17	22
Lifting Magnets.	15	14	18
Lifts.	6	37	48
Locomotives.	12½	17	22
Runways and Trolleys.	7½	29	38
Sheerlegs.	6	37	48
Stacking Machines (Packages).	7½	29	38
Transporters.	7½	29	38
Weighbridges.	7½	29	38
Winches.	7½	29	38
7. *Shop Fixtures.*			
Benching.	10	22	28
Bins.	10	22	28

Building and Fixed Plant Classification.

Buildings & Fixed Plant—Representative Classification, contd.

	Prov. Dep. %	Years. 10%	Years. 5%
7. *Shop Fixtures, contd.*			
Guards, Machinery and Belting.	10	22	28
Mess Room Appliances.	7½	29	38
Partitioning, Metal.	6	37	48
Partitioning, Wood.	10	22	28
Racks, Hat and Coat.	12½	17	22
Racks, Tool.	7½	29	38
Shelving.	10	22	28
Storage Fittings, Steel.	6	37	48
Storage Fittings, Wood.	7½	29	38
Time Recorders and Racks.	12½	17	22
Washing Appliances.	7½	29	38
8. *Special Process Plant*			
Acetylene Gas Plant.	10	22	28
Brazing Plant.	15	14	18
Cupolas.	7½	29	38
Furnaces, Annealing, Hardening and Tempering.	15	14	18
Furnaces, Electric.	15	14	18
Furnaces, Gas and Oil.	15	14	18
Furnaces, Welding.	15	14	18
Galvanising Plant.	12½	17	22
Heating Machines.	12½	17	22
Magnetic Separators.	7½	29	38
Mortar Mills.	6	37	48
Muffles.	12½	17	22
Oil Extractors.	6	37	48
Oil Heaters.	7½	29	38
Pickling Vats.	10	22	28
Sand Blast Apparatus.	12½	17	22
Sand Grinders and Mixers.	12½	17	22
Screening Machines,	12½	17	22
Smith's Forges & Hearths.	12½	17	22
Stoves, Core.	15	14	18
Stoves, Enamelling and Japanning.	10	22	28
Tumbling Barrels.	12½	17	22
Welding & Cutting Plant.	12½	17	22
9. *Machines.*			
Automatic Screw Machines, Bar.	7½	29	38
Automatic Screw Machines, Chucking.	7½	29	38
Belt Lacing Machines.	6	37	48
Bolt and Nut Machinery.	7½	29	38
Boring Machines, Horizontal.	6	37	48
Boring Machines, Portable.	6	37	48
Boring and Turning Mills, Vertical.	6	37	48
Broaching Machines.	6	37	48
Bull dozers.	7½	29	38
Cam-cutting Machines.	7½	29	38
Centering Machines.	6	37	48
Cutting-off Machines.	6	37	48
Draw Benches.	6	37	48
Drilling Machines, Multi-Spindle.	7½	29	38
Drilling Machines, Portable	7½	29	38
Drilling Machines, Radial.	7½	29	38
Drilling Machines, Sensitive	7½	29	38
Drilling Machines, Vertical.	7½	29	38
Drop Stamps.	10	22	28
Engraving Machines.	7½	29	38
Filing Machines.	10	22	28
Flanging Machines.	6	37	48
Forging Machines.	7½	29	38
Gear Cutting Machines, Hobbing.	6	37	48
Gear Cutting Machines, Milling.	6	37	48
Gear Cutting Machines, Planing.	6	37	48
Grinders, Cutter.	12½	17	22
Grinders, Cylindrical Plain.	7½	29	38
Grinders, Disc.	7½	29	38
Grinders, Drill.	7½	29	38
Grinders, Internal.	12½	17	22

	Prov. Dep. %	Years. 10%	Years. 5%
9. *Machines, contd.*			
Grinders, Saw.	7½	29	38
Grinders, Surface.	12½	17	22
Grinders, Tool, Wet.	7½	29	38
Grinders, Universal.	7½	29	38
Grinding & Polishing Heads.	6	37	48
Grindstone Troughs.	6	37	48
Hammers, Belt Driven.	10	22	28
Hammers, Drop.	10	22	28
Hammers, Pneumatic.	10	22	28
Hammers, Steam.	10	22	28
Hydraulic Machinery.	6	37	48
Key-seating Machines.	7½	29	38
Lathes, Bench Precision.	7½	29	38
Lathes, Boring and Facing.	6	37	48
Lathes, Brass Finishers.	7½	29	38
Lathes, Capstan.	7½	29	38
Lathes, Crankshaft.	7½	29	38
Lathes, Engine.	6	37	48
Lathes, Hand.	6	37	48
Lathes, Pulley.	6	37	48
Lathes, Relieving.	6	37	48
Lathes, Shaving.	7½	29	38
Lathes, Turret, Horizontal.	7½	29	38
Lathes, Turret, Vertical.	7½	29	38
Lathes, Wood-working.	6	37	48
Marking Machines.	6	37	48
Milling Machines, Circular Forming.	6	37	48
Milling Machines, Hand.	6	37	48
Milling Machines, Horizontal, Plain and Lincoln.	6	37	48
Milling Machines, Universal	6	37	48
Milling Machines, Vertical and Slot.	6	37	48
Moulding Machines.	12½	17	22
Paint Mills.	7½	29	38
Pipe Bending Machines.	6	37	48
Pipe Cutting and Screwing Machines.	7½	29	38
Plate Bending Machines.	6	37	48
Planing Machines, Parallel.	6	37	48
Planing Machines, Rotary.	6	37	48
Polishing Machinery.	6	37	48
Presses, Hydraulic.	6	37	48
Presses, Pneumatic.	7½	29	38
Presses, Belt Driven.	6	37	48
Profiling Machines.	6	37	48
Punching Machines, Hydraulic.	6	37	48
Punching Machines, Belt Driven.	6	37	48
Punching and Shearing Machines, Steam.	6	37	48
Rivetters, Pneumatic.	7½	29	38
Rivetters, Hydraulic.	7½	29	38
Rivetters, Steam.	7½	29	38
Sawing Machines, Metal, Band.	7½	29	38
Sawing Machines, Metal, Circular.	7½	29	38
Sawing Machines, Metal, Hack.	12½	17	22
Sawing Machines, Wood, Band.	6	37	48
Sawing Machines, Wood, Circular.	6	37	48
Saw Sharpening Machines.	7½	29	38
Shaping Machines.	6	37	48
Shearing Machines, Rotary.	6	37	48
Sheet Metal Working Machinery.	6	37	48
Slotting Machines.	6	37	48
Slotting Machines, Portable	6	37	48
Swaging Machines.	10	22	28
Tapping Machines.	7½	29	38
Testing Machines.	5	45	58
Thread Milling Machines,	6	37	48
Thread Rolling Machines.	7½	29	38
Welding Machines.	12½	17	22
Woodworking Machinery.	6	37	48

Works Cost Allocation Abstract.

THE first abstract to be considered is the Works Cost Allocation Abstract. This has to be rendered to the Financial Department at the end of each works account period, that is fortnightly under the scheme advocated. The items to be included, in accordance with the present works accounting system, are as follows :

1. **Group Totals for Sales Orders.** (Series A.)
2. **Group totals for Sales Repairs and Sundries Orders.** (Series B.)
3. **Group totals for Stock Manufacturing Orders.** (Series C.)
   In all the above the allocation will be shown separately as to Materials, Disbursements, Wages and Shop Charges.
4. **Account totals for each Process Cost Accounts.** (Series G, H & K.
   In accordance with the group of standing orders in each series.
   It will be necessary in this connection to include under the heading of shop charges the departmental apportionment of Works expenses to Iron Foundry, Brass Foundry and Smithy in accordance with the Shop Charges Book.
5. **Group totals for Developments and Experiments Orders.** (Series D.)
6. **Account totals for each Works Expenses Standing Order.** (Series R & S.)
7. **Account totals for each Works Sundry Standing Order.** (Series U.)
   Only certain Sundry Standing Orders are necessary to the financial accounts—viz. : Expenditure chargeable to Commercial Expenses (U 1-1), Repairs to Office Equipment—General (U 1-2), and Scrap Stock Values (U 2-1). The remainder are in the nature of Works Suspense Accounts and are cleared by the end of the year by transfer to other Works Accounts or by inclusion on the Annual Abstract.
8. **Account totals for each Works Additions Standing Order.** (Series N.)
   A subsidiary abstract should be provided detailing the descriptions of work on which the current expenditure has been incurred. See Plant Sub-Orders Cost Summary (5-137).

No shop charges will be reported to the financial accounts in connection with items 5, 6, 7, and 8 above. A specimen Works Cost Allocation Abstract is given in Section VI f—Form 6-42, with fictitious figures filled in.

Works Products Abstract.

The second fortnightly abstract to be dealt with is that known as the Works Products Abstract of which also a specimen is given in Section VI f—Form 6-44. The items in this abstract have all reference to the amounts to be debited to the *Works Materials Suspense Account* and credited to the accounts to which the costs of production have been allocated.

Returns from customers come within the scope of this abstract in respect to the works value of the goods returned into stock. It will be readily appreciated that the credit passed to the customer through the financial books reduces the sales totals, and it remains for the cost of sales orders to be also reduced accordingly. In the financial books the *Sales Orders Account* is credited therefore and the *Works Materials Suspense Account* debited.

The works value of the items of product completed, that is, delivered to warehouse, and the works value of goods returned from customers or agents can be advantageously summarised in the Works Expenditure Book, as already explained.

Works Products Abstract. 5-119.

The items on the abstract will be as follows :

1. Works Value of Process Product.

To be credited to *Iron Foundry Process Account.*
,, ,, ,, *Brass Foundry* ,, ,,
,, ,, ,, *Smithy* ,, ,,
And debited to *Works Materials Suspense Account.*

2. Works Value of Stock Product.

To be credited to *Stock Manufacturing Account* and debited to *Works Materials Suspense Account.*

3. Works Value of Goods Returned from Customers.

To be credited to *Sales Orders Account.*
,, ,, ,, *Sales Repairs and Sundries Account.*
And debited to *Works Materials Suspense Account.*

4. Works Value of scrap recovered from orders in progress but not credited to same.

To be credited to *Scrap Account* and debited to *Works Materials Suspense Account.*

5. Works Value of scrap recovered from orders in progress and credited to same.

To be debited to *Works Materials Suspense Account.*

These credits to orders in progress are already embodied in the Works Cost Allocation Abstracts and have accordingly reduced the total allocation of materials to be posted to the credit of the *Works Materials Suspense Account.* It is necessary to separately debit the account with the value of the scrap received into stock, for the sake of the Stock Accounts, in which it must figure as fresh material and not returned material.

This transaction of crediting and redebiting the same account must be understood as only necessary to allow the Stock Account for scrap to derive its receipts through the regular channel of the Works Expenditure Book, and so avoid throwing out of gear the divisions in which the materials accounts are kept by the Works.

Coming to the third abstract, the Works Account Annual Abstract, this is prepared at the end of each year after the stocktaking has been completed. Some of the items can only be arrived at by conference with the General Manager and possibly the Directors, and these, in the following list, are indicated as " settled by conference."

Works Account Annual Abstract.

1. Stock Value of Work in Progress.

Sales Orders (Series A).
Sales Repairs and Sundries Orders (Series B).
Stock Manufacturing Orders (Series C).
Iron Foundry Account (Series G).
Brass Foundry Account (Series H).
Smithy Account (Series K).

These values will be derived from the Cost Ledger balances after careful adjustment in accordance with the results of the work-in-progress inventory.

From the totals a reserve must be made to cover unexpired guarantee liabilities, and this provision should be settled by conference.

2. Values to be carried forward.

" Settled by conference."
Experimental Orders (Series D).
Patents, Drawings and Patterns.
Jigs and Special Tools.

3. Stock Values.

a. General Stock.
b. Component Stock.
c. Complete Product.
d. Loose Plant.
e Office Equipment.
f. Discarded Plant Scrap Values.

Works Account Annual Abstract.

These are a matter of inventory in conjunction with the stock account balances. The inventory, as regards items *a*, *b* and *c*, requires to distinguish between standard or good stock, and non-standard, or doubtful and bad stock, and the distinction must be made before the Works submit the net inventory values. The amount to be written off should be settled by conference. To maintain agreement with the financial books as to Works materials, the actual amount written off stock for the year requires to be reported on the Works Account Annual Abstract.

The problems of the Loose Plant and Office Equipment inventory have been already dealt with. Discarded Plant Scrap Values represent the value of discarded plant not disposed of at the time of stocktaking. Obviously only realisable prices must be used and the existence of the items valued must be verified, the more so as no strict account is likely to be feasible of the consumption of discarded plant during the year for repair purposes, etc.

4. Depreciation.

Settled by conference at the end of each year as to the average rates of depreciation to be used for each group, viz.:

1. Land and Buildings.
2. Motive Power Plant.
3. Mechanical Transmission.
4. Electrical Transmission.
5. Pipe Transmission.
6. Transportation Plant.
7. Shop Fixtures.
8. Special Process Plant.
9. Machines.

The rates so settled are used throughout the year for shop charge purposes and the total depreciation for the year thus provided for is reported on the Works Account Annual Abstract.

A supplementary amount for depreciation is included in respect to extra depreciation on individual items of discarded plant, which when discarded stood in the books at a higher value than the value realised by their sale. As previously explained, this extra depreciation meets the question of obsolescence as it arises.

The yearly totals of both the annual depreciation and the extra depreciation are derived from the Shop Charges Book.

The Works Manager should be responsible for the sufficiency of the depreciation reported in this way, and if the Works have been running excessive hours, it will be for him to make recommendations as to a further general depreciation on those grounds.

5. Advance Expenditure.

This item has reference to any expenditure that has been incurred on behalf of a period not fully expired at the end of the year, such as rates and insurance premiums. Full details are necessary in the annual abstract.

6. Liability Reserve.

This item deals with the reverse conditions to those indicated for item No. 5. In this case, liabilities in respect to the current year for which no invoice or charge has been presented must be enumerated. A typical case, if the Company do not insure against accident compensation risks, will be the outstanding liabilities in respect to accident cases that have not been settled.

Full details, not merely totals, are necessary in the annual abstract.

7. Wages Reserve.

In this instance the character of the reserve is to provide for wages allocated in the current year's accounts but not included in the cash expenditure for that period. The occasion for this reserve will arise when the end of the year precedes by a day or two the end of a pay week.

8. Works Expenses Supplementary Allocation.

There will inevitably be some difference either of under-allocation or over-allocation of Works expenses in the course of the year, and what this amounts to will be evident from the Shop Charges Book.

It is desirable to apportion whatever difference there may be to the respective classes of orders to which it applies, viz. Sales, Sales Repairs and Sundries, Stock Manufacturing Orders, and Process Accounts. The basis of apportionment may very well be the ratio of the shop charges totals as already applied during the year in the ordinary way. This adjustment will serve to dispose of the whole of the Works expenses as they appear in the financial books.

A specimen Works Accounts Annual Abstract is given in Section VI f—Form 6-45, with fictitious figures illustrating the above arrangements.

Section IV m

Administrative Statistics.

General Consideration.

OCCASIONAL reference has been previously made to the use of works accounts figures for administrative purposes. This phrasing has been adopted to indicate the use of works accounts apart from

General Consideration.

their strict accountancy object of linking up the various stages of expenditure for financial account purposes.

To avoid confusion with the accounts as such, it will be convenient to speak of the data derived from the accounts for administrative purposes as administrative statistics.

The principle on which a works accounting system is constructed should be such as to provide with the minimum of analysis or reconstruction, the essential statistics necessary for exercising continuously efficient control.

The nature, policy and condition of each business and the type of management, all have their influence on the form in which statistics of this character can be best extracted.

The initiation of statistical abstracts may emanate from the Directors or the General Manager of the Company, but it may be well for the Works Manager to arrange with the Works Accountant for abstracts to be prepared for his own guidance as will be suitable, if need be, for the General Manager's use, rather than have overlapping abstracts, with the consequent extra trouble. The Works Manager should apply his practical experience of the conditions of the factory so as to ensure that the statistics reflect the real facts of the case.

The proper use of statistics demands an intimate knowledge of how the figures are arrived at, and the Works Manager should interest himself closely in the works accounting system by which the data is collected.

The General Manager may be expected to exercise a judicious restraint as regards the variety of statistics required by himself or the Directors, lest abstracts be made with monotonous regularity that cannot be used, probably for want of time, and possibly for want of inclination. It is an unwise discipline that insists on statistical abstracts and reports as a matter of form, and merely as a visual demonstration of authority. On the other hand, a proper works accounting system is largely abortive, if detail figures are entirely ignored, for in this direction lies the means of recovering many times over the expense of keeping proper works accounts by increased works efficiency and economy.

It is really the Works Manager for whom the works accounts should realise their greatest possibilities, and he is robbed of his finest opportunities if he is not allowed to take an adequate interest in the works accounts.

The Works Accountant can do a very great deal to help the Works Manager to get the benefit of the data that is collected, but that presupposes that the works accounts are not held to be a private preserve of the commercial side of the business.

General Consideration.

American writers in particular have voiced the need for broad views to be taken of the functions of works accounts, or as they put it, of cost accounts, which is a difference of term rather than of meaning.

It is generally recognised that the value of statistics lies in their availability for comparison, and that averaging is necessary to get their true import.

From this follows two main requirements in statistics, firstly, that the scope of the figures to be compared shall be identical, and secondly, that the basis upon which averages are calculated shall be such as will not misrepresent the facts underlying the original figures.

A typical example of how average statistics can be misused is in connection with works expenses. Works expenses are very commonly averaged as a percentage of the direct wages. This is so temptingly easy to do that few can resist doing it. The harm is not in trying out the figures in this way, but in accepting the resulting average ratios as incontestable evidence of the efficiency or otherwise of the works management.

A very brief consideration will show the inherent fault in such a method. Firstly, if machine work is substituted for hand work, the direct wages total will fall appreciably, and the expense total may rise a little, while the ratio of expenses to direct wages will increase to a marked degree.

Similarly, if the quality and interchargeability of machine work is so improved that fitting work is largely eliminated, the expense ratio to direct wages will rise. Again, if automatic machines are substituted for hand operated machines, or if semi-automatics, served by low rated help, are substituted for machines served by full rated mechanics, the expenses ratio to direct wages will rise. Yet again, if by improving the shop services in regard to supply of material, drawings, tools, etc., the direct wages are reduced for the same output, the expenses ratio to direct ratio will rise. Who will say that these rises in expense ratio to direct wages indicate inefficient management, and yet there are men, in positions where more understanding might be expected, who will criticise the works management adversely on statistics that show an increased expense ratio on this basis. If this is the attitude of Directors, the Works Manager is in a difficult position, because the facts he can point to in support of his own case are not reflected by the method of compiling the statistics.

The way of the reformer is hard enough anyway, if works reorganisation is his objective, but it is made impossible if statistics are wilfully misapplied to the results of his labour.

General Consideration.

There is one way to apply statistics of works expenses to indicate with some fairness the efficiency of the management, and that is on the basis of the inclusive costs of the product as a whole. There is difficulty in doing even this usefully, unless there is some standard by which the costs themselves can be tested. Where the product is varied, and varies differently each year, the only basis left that will allow periodical comparison is the turnover of business, or totals realised from the sale of the product. Adjustments must needs be made, before using these figures, as to products made, but not sold.

Beyond that the state of trade will affect selling prices differently in different years, so that the turnover basis is only an approximately fair basis for calculating the works expense ratio ; but it has the merit of showing the influence of works expenses on profits, and no works manager can object to his work being criticised in that light.

This discussion as to works expenses ratios has no reference to the allocation of works expenses to the works product. The disclaimer is made lest there be any confusion to the reader who may be aware that it is not at all uncommon for the works expenses ratio to direct wages to be used for actually allocating the works expenses to the various orders.

The foregoing illustrations will have emphasised the necessity for careful consideration in the application of statistics generally.

Statistical Surveys.

With reference to making recommendations as to specific statistical abstracts, or surveys as they may be better designated, it is perhaps not necessary to attempt more than an outline of some of the surveys likely to be of general use. Each business will demand its own particular form of surveys. There will be an economical limit to the volume of statistics that can be dealt with, and the selection must be confined to the periodical surveys that can be put to proper use.

Particular attention has been given in the planning of the works accounting system dealt with in this book, so that the several stages in the ordinary accounting routine lend themselves to administrative purposes.

Starting with the works expenditure, a survey of the fortnightly totals of the purchases, etc., tabulated under the same headings as recommended for the Works Expenditure Book, will involve only a few minutes' work at each account period, and will be most useful in detecting the tendencies of purchases for special purposes, and purchases for stock purposes, also of the value of process and stock products.

The other side of the matter, as regards material used, can be

Statistical Surveys. derived just as readily from the Stock Ledger in the process of agreeing the issue totals with the Cost Allocation.

By the aid of these two surveys, some control can be exercised as to the investment in stock practically continuously throughout the year.

The means that are thus given to the General Manager to criticise the stock control efficiency of the works, also provides the Works with the opportunity of demonstrating the efficiency of that control.

After all, administrative statistics should not be considered as only designed to serve for adverse criticism, for the means that ensure fair criticism should as equally ensure the recognition of good work done.

Turning to wages expenditure, the totals to be derived from the
5-116. Works Expenditure Book are not sufficient for survey purposes.
5-30. The Wages Allocation Summaries will, however, furnish very useful data.

The direct wages figures for each group of orders (sale and non-sale) in each department will be particularly serviceable in indicating the direction in which the works' energies are being absorbed. It will show the direct wages element entering into non-sale orders.

The secondary wages figures will be of especial value and should be expressed as a ratio of the direct wages (machine and hand together) for each department.

The amount of the overtime charges will be also a portent of some significance.

Again the shop charges totals, representing the allocation of works expenses to the work-in-hand, can be advantageously used by working out the percentage that each departmental total is of the grand total.

The comparison of percentages for successive periods can then be usefully plotted on squared paper to give a visual or graphic representation of the relative burden of works expenses that is carried by each department.

There will also be for each department a normal apportionment of works expenses that the product of that department should carry, by the application of normal shop charge rates, and graphical charts of the shop charge totals for each amount period will indicate whether the normal departmental expenses are being met.

On the same chart, by figures derived from the Shop Charges Book, should be plotted in distinctive colour ink the curve representing the actual departmental expenses as apportioned.

The chart would be cumulative in form, so that the total of each period is added to the previous total, and the curve rises from zero at the beginning to the year's total at the end.

Statistical Surveys.

Curves can be plotted of the departmental expenses apportioned and the shop charges applied. Two diagonal lines can be also drawn, one to represent the reference total of departmental expenses assumed in working out the normal shop charge rates and one to represent the total departmental expenses of the previous year spread evenly over the fortnightly account periods.

With such charts prepared for each department, and a similar one prepared for the works as a whole, a very real insight is obtained as to the trend of the relative factory efficiency. The charts will show also the extent to which the normal shop charge rates correspond with the actual current conditions.

The next survey that may be advocated can also be with advantage in graphic form, and that is one showing the relation of sales to delivered order costs. The sales figures will be derived from the financial books, and the delivered order costs from the Delivered Orders Cost Abstracts. 5-138.

The chart should be in cumulative form, with a diagonal reference line indicating the minimum turnover considered necessary to meet normal commercial expenses, and a further curve representing the previous year's turnover.

The comparison of estimated costs with actual costs is referred to in Section II e. This comparison might be usefully developed to deal with classes of product, during a given period, in the form of a chart.

SECTION V

ROUTINE FORMS

Introductory Remarks

THIS section comprises a set of forms that are offered to help focus the discussion that has gone before, to assist the reader in settling routines to suit his own particular needs, and possibly to guide him in designing his own forms. The illustrations are not to scale, and usually only headings are given.

In attempting to cater for a wide range of conditions, the forms are not only full in point of numbers but also in point of detail. They further represent an achieved organisation rather than the stages by which that organisation can be obtained. This means that the reader must discriminate for himself as to what does or what does not apply to his business. Being clear as to his own goal he must further decide, in the light of his own conditions, by what stages he shall accomplish the organisation that shall represent efficiency for him. The reader is recommended, therefore, to note down from time to time, in the space provided opposite each form, those points which his business necessitates he should keep in mind. Notes of this sort in conjunction with the concrete form examples before him will be found invaluable for reaching a sound decision when problems of organisation come up for settlement.

The virtues of any one routine, as embodied in these forms, are not necessarily dependent on the acceptance of all or any of the other one hundred and forty-four examples that are given.

Notes are given as to the routine applicable to each form, more to demonstrate a possible interlinking or co-ordinating of all the forms than to dogmatise as to a best system for all conditions.

Local conditions must finally mould any and every routine, so that suggestion without knowledge of these conditions can perhaps only go as far as to stimulate the reader to criticise his own methods in the light of a different outlook.

The reader is also referred to the remarks in the Introduction relative to this section, and in Section II b—Routine Organisation.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-1. 5-1.

STAFF EMPLOYMENT APPLICATION.

W. BLANK & CO. LTD.,
ENGINEERS AND MANUFACTURERS.

EFFICIENCY WORKS,
MAIN ROAD,
LONDON..................

DEAR SIR,

In the event of a suitable vacancy occurring, your application will be duly considered if you return this form to us carefully filled up in your own handwriting. References to present employers will not be made before an interview has taken place. Only copies of testimonials should be submitted, as they cannot be returned, and should preferably be on this size sheet and typewritten.

Applications are kept for three months only.

We cannot undertake to answer any enquiries as to vacancies.

Yours faithfully
W. BLANK & CO. LTD.

Capacity in which employment is sought ....

PREVIOUS EMPLOYER	DATES.		BUSINESS.	POSITION HELD.
	From	To		
....	....	....	....	....
....	....	....	....	....
....	....	....	....	....
....	....	....	....	....

Particulars of Certificates and Diplomas obtained..

....

Special Qualifications..

....

Age..................Married or Single...............................Approx. Salary expected....................

No. of Testimonials enclosed.................................Signed...

INTERVIEW NOTES (CONTINUED ON OTHER SIDE).	TERMS OF ENGAGEMENT—IF ARRANGED.
....	....
....	....
....	....

Form used for sending to applicants for staff positions. In the case of an advertised vacancy, form is sent out to likely applicants, with a covering letter arranging an interview. Fares are not usually allowed to successful applicant.

Form size same as letter paper (say 10″ × 8″). Printed with margin for filing.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-2. 5-2.

STAFF ATTENDANCE BOOK.

W. B. & CO. LTD.

Week ending Saturday....................................

Please sign "IN" immediately on arrival, and sign "OUT" on departure at end of day. Arrivals and departures at other than the regular times are to be entered in *red ink*. This rule applies when lateness exceeds five minutes.

NAME.		MONDAY.		TUESDAY.		WEDNESDAY.		THURSDAY.		FRIDAY.		SATURDAY.	
		Time.	Initials.	Time.	Initials	Time.	Initials.	Time.	Initials.	Time.	Initials.	Time.	Initials.
	IN												
	OUT												
	IN												
	OUT												
Passed by Head of Dept.		....		....		....		....		....		....	

This book is arranged for the names of the staff to be set down in a fixed order beforehand and for initialling in the prescribed spaces to be sufficient. The fixed order makes reference easy, and absence is indicated by blank squares. Late arrival and overtime is indicated by the use of red ink. Size of book may be foolscap (13″ × 8″).

5-3. 5-3.

WEEKLY STAFF REPORT.

W. B. & CO. LTD.

DEPT.......................... WEEK ENDING SATURDAY..................

NAME.	M.	TU.	W.	TH.	F.	S.	HOW EMPLOYED.	Order No.	Total Hrs.	Chargeable to Orders.			GENERAL		

Signed..Head of Dept.

These reports are particularly necessary in the case of the Drawing Office, when time of draughtsmen is booked against specific orders. A column is provided for aggregating the items of a general character. The form might be used for Chargehands and Inspectors, even when paid by the hour, and not therefore strictly on the staff. The time allocated as "General" in the second money column would be debited as a whole to the appropriate Standing Order (see Works Accounts). Size of form, say, 8″ × 10″.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-4. INWARDS CORRESPONDENCE ENDORSEMENT STAMP. *5-4.*

REC'D	TIME
DEPT. TO REPLY	COPIES TO
Nº.	
REPLY DATED	FILE NO.

Inwards letters are endorsed with this stamp, which dates and numbers consecutively at one operation. The numbers correspond with those in the Inwards Correspondence Register, which is entered up from the letters. The time of receipt would only be necessary after the first morning's delivery. File No. has reference to the folder or cover in which letter is filed, a copy of reply being filed with same.

5-5. INWARDS CORRESPONDENCE REGISTER. *5-5.*

Cut off when Clear.

W. B. & CO. LTD.

TELEGRAMS. Entered in red or underlined in red.

* FORMAL ACKNOWLEDGMENT. Date assumed same as received unless noted. p/a = prelim. ack., f/a = final.

Sheet No.............

Date.........................

Ref. No.	Time rec'd.	Sender.	Subject Key Words.	Copies sent to	Dept. to reply.	Summary of Contents if original leaves Corr. Off.	* Ack.	Reply Letter sent.	File No.
0									
1									
2									
3									
4									
5									

This register is arranged in sheet form to facilitate typing the entries. The size of sheet may correspond with the folders in use, usually about 8½″ × 11″. The corner is to be cut off when all the letters registered thereon have been dealt with. The column for Subject Key Words is merely as an aid to finding the entry of any particular letter.

5-6. CORRESPONDENCE INDEX CARD. *5-6.*

W. B. & CO. LTD.

FILE NO...................................

TELEGRAMS.

This card is arranged for typing in name and address, or printing in same by means of an addressing machine. The entries on the cards may refer to subject subdivisions under the main file No., and/or may give the dates of the more important letters sent and received. Size of card may be 4″ × 6″.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-7. ILLUSTRATIONS REGISTER. 5-7.

W. B. & CO. LTD.

CLASS...REF. NO...

BLOCK.

Style.......................................

Made by.......................................

Date.................. Cost ....

ELECTROS (OR PHOTOS) SENT OUT.

No.	To	Date sent.	Date returned.
....	....	....	....
....	....	....	....

This register is arranged in removable sheet form rather than on cards. A pull from the block or copy of photo is attached to each sheet. When the space provided for entering "electros sent out" is filled, extra slips can be attached. The No. column should be filled in—one line for each electro—as the electros are ordered, and re-entry made when electros are returned, though usually it hardly pays to get electros returned. This will show the margin of electros available. Size of sheet possibly 8½″ × 11″.

A	B	C	D	E	F	G	H	J	K

5-8. SALES PROMOTION INDEX CARD. 5-8.

W. B. & CO. LTD.

Credit Status.	Traveller.	Correspondence File No.

TRAVELLER'S CALLS.		LITERATURE LEFT OR SENT.		FORM LETTERS SENT.		ENQUIRIES RECEIVED.		QUOTN. SENT.	ORDERS RECEIVED.	
Report.	Date.	Key.	Date.	Key.	Date.	Date.	Class of Goods.	Ref.	Order No.	Date.
....	....	....	....	....	....	....	....	....	....	....
....	....	....	....	....	....	....	....	....	....	....

This card is intended for following up travellers' calls and enquiries, and for sales promotion by correspondence. The squares at head of card are for applying signal tabs to indicate class of goods in which firm is known to be interested. This facilitates sending out of specialised literature. The entries as to travellers' calls will be derived from the Daily Reports. Key letters or symbols are used to indicate the respective catalogues, pamphlets and circular letters. The cards may be headed by means of addressing machines, as used for envelopes (see also Correspondence Index Card). Size of card, 5″ × 8″. Possibly different colours for different travellers' districts may be useful, or as between exporters, factors and agents.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-9.

5-9. **ESTIMATE DETAIL SHEET.**

W. B. & CO. LTD. ESTIMATE NO.................................

FOR.. Sheet No................Date...................

Quan.	Description.	Drawing and Specification	Class of Material.	Weight (lbs.)	Rate.	Material Cost.	Process Product.	Direct Wages.			Shop Charges.	Notes.
								Dept.	Machine.	Hand.	%	

These detail sheets will enumerate every component and fitting required according to Drawings and Specifications. The column for Process Product will comprise mainly Castings and Forgings. Shop Charges will be applied for estimating purposes as a percentage of Direct Wages (either Machine or Hand, and varied according to department), although applied on basis of time worked in the cost accounts. Components entered at inclusive stock prices to be on separate sheet. Each estimate will be summarised on an Estimate Reference Sheet, for comparison with actual cost, if order obtained. Size of sheet may be 8″ × 13″.

5-10.

5-10. ESTIMATE REFERENCE SHEET.

W. B. & CO. LTD.

Date of Estimate..............
,, Order...................
,, completed ....

SALES ORDER NO. ....

ESTIMATE NO. ....

Class..................Class No..................

For ....

PARTICULARS OF ORDER.

....

Ref.	ESTIMATE.	Notes.	Ref.	COSTS.	Notes.
	Drawings, Patterns, Jigs and Special Tools			Drawings, Patterns, Jigs and Special Tools	
	Material Process Products Components at Stock Prices			Mat'l, Special Purch. ,, General Stock Component Stock Process Products	
	Direct Wages, Machine ,, Hand Secondary (as % of above)			Direct Wages, Machine ,, Hand ,, Secondary	
	Shop Charges			Shop Charges	
	Contingency Allowance			Direct Overtime All'ce Errors and Defects Disbursements	
	Final Inspection, Packing and Despatch			Final Inspection, Packing and Despatch	
Certified...................... Date........................			Certified .... Date		

This sheet is arranged to serve first as a summary for each estimate, as worked up on the Estimate Detail Sheets. Should an order eventuate, the costs will be entered, in the columns provided, in groups corresponding with the estimate. In printing the form, space may be provided at the foot for comments on the points suggested by comparison of costs against estimate. When complete, and the more obviously necessary investigations made, each set of figures should be submitted to the General Manager. The size of sheet may be 10″ × 8″, with margin at side for filing.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-11. **TENDER.** *5-11.*

W. BLANK & CO. LTD.
Engineers and Manufacturers,
EFFICIENCY WORKS, MAIN ROAD,
LONDON.

TELEGRAMS:
BLANKCO, LONDON.

TELEPHONE:
000, LONDON.

REF............................DATE......................
Kindly quote both when replying.

DEAR SIRS,

Agreeably to your instructions of..............................ref..............................we have pleasure in submitting this quotation, as detailed below, and trust same will enable you to pass us your orders, which at all times will have our strict attention.

Yours faithfully,
For and on behalf of
W. BLANK & CO. LTD.

....

Delivered..

Estimated Time of Delivery..In case of strikes or stoppages through unforeseen circumstances deliveries may be suspended.

Terms of account: Monthly, less 2½ % cash discount.

Packages will be charged for and credited in full, if returned promptly in good condition, carriage paid.

This offer is open for.........................days.

When the nature of the business requires it, tenders may be sent out in neat folders, suitably printed, containing specifications and photos mounted on sheets. The set of papers and folder should be securely fastened together. In some businesses it may be necessary to emphasise that " this offer will not apply to less quantities than specified herewith." In other cases, it will be advisable to incorporate a note to the effect that " We do everything in our power to ensure good material and workmanship together with quick despatch, but we disclaim all responsibility for failure in any of these respects beyond the replacement, wherever practicable, of defective work." Size of form same as letter paper.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-12.

5-12.

OFFICE ORDER.

W. B. & CO. LTD.

Date issued .... ORDER NO. ....

COPY FOR	CUSTOMER	Customer's Reference Date

DELIVERY (Address of Consignee to be given if goods not to be sent direct to Customer)

PACKAGES MARKED

Route

Carriage

Delivery required

Invoice Ref.

Checked ....Acknowledgment sent ....Order approved ....

Price and Terms of Payment	Copies issued to	Shipping Instructions	Deliveries		
			Despatch Ref.	Quan.	Date
Our Tender No.	1. Invoice Clerk		....		
	2. { Estimator and Works Accountant		....		
	3. Works Manager	Marine Insurance			
	4. Drawing Office		Completed		
	5. Works Office		Signed		
	6. Warehouse				

These orders should be typewritten, and with suitable paper and machine, six copies may be obtained at one typing. The form is termed "office order," for use either as a Sales Order, Sales Repairs and Sundries Order, Stock Manufacturing Order, Experimental, Demonstration or any other class of order.* In the case of Sales Repairs and Sundries Orders it may be possible to manage with three copies (Invoice Clerk, Works Office and Warehouse). The bottom right hand corner is to be cut off when the order is completely invoiced. Rubber stamp endorsements will serve to mark items to come from a Stock Manufacturing Order and whether goods are in warehouse or in progress. The size of form may be 10″ × 8″.

5-13.

5-13.

ACKNOWLEDGMENT OF ORDER.

W. BLANK & CO. LTD., Efficiency Works, Main Road, LONDON.

Date ....

Your Order, No ....for ....

is to hand and has our strict attention.

We enter at prices as per .... Terms ....

and anticipate making delivery ....

W. B. & Co. LTD.

This acknowledgment may be in postcard form with advertising matter thereon. Acknowledgments will not be necessary if goods are despatched same day.

---

* For Production Order under Sales Order Ref. see Form 5-49.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-14. 5-14.

ENQUIRY.

W. BLANK & CO. LTD.
Engineers and Manufacturers,
EFFICIENCY WORKS, MAIN ROAD,
LONDON.

TELEGRAMS:
BLANKCO, LONDON.

TELEPHONE:
000, LONDON.

RAILWAY SIDING
SERVED BY G.W.
& L. & N. W. RYS.

Ref.......................Date....................
Kindly quote both when replying.

DEAR SIRS,

We beg to invite your quotation, stating your best trade and cash discounts, for the supply of the undermentioned goods.

We particularly request that you state your shortest time for delivery or, should you not have the goods in stock, when you could commence delivery and at what rate you could continue.

Yours faithfully,
For and on behalf of
W. BLANK & CO. LTD.
....

Goods to be delivered carriage paid to these works.

Price to be stated per..................

Terms of account Monthly, less 2½ % unless otherwise quoted.

Packages to be credited in full when returned.

Quotation to be received not later than first post on..

This form may be printed on ordinary letter paper, but an entirely special form is usually worth while. Enquiries for estimating purposes only should be so marked. The acknowledgment of unaccepted quotations is a courteous practice that obviates enquiries and saves a certain amount of time. A post card (with advertisement matter thereon) may be used, stating "We have duly considered your quotation of........ref........for which we thank you, but find ourselves unable to pass you an order on the present occasion." Size of form, say, 10″ × 8″.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-15.

5-15.

PURCHASE ORDER.

W. BLANK & CO. LTD.
Engineers and Manufacturers,
Efficiency Works, Main Road,
London.

Telegrams:
Blankco, London.

Telephone:
000, London.

Reqn. No..Purchase Order No. Date....................

Railway Siding Served by
G. W. and L. & N. W. Rys.

It is important to us that this Order No. be marked on the packages and quoted on Advice of Despatch and Invoice.

This Order requires to be acknowledged and delivery confirmed.

We rely on your sending us by post an Advice of Despatch the same day as goods are sent.

} To be noted in your Order Book.

Please supply and deliver carriage free to above works.

	Delivery Requirements.	Price or Quotn. Ref.
Usual Terms: Monthly, less 2½ %. Specification Sheets enclosed.		

Purchase Orders require to be in triplicate, the second copy remaining with the Buyer and the third copy going to the Receiving Clerk, without prices. It will be generally found better to have all three copies loose, rather than for the third to be fast in book form, so as to facilitate reference and to allow the orders to be typewritten. Sometimes, as a safeguard and for numerical reference, the top or executive copy is copied, after being signed, in a press letter book, the order Nos. being added before copying to correspond with the letter book folio. It is generally desirable to confine each order to one item. The back of the Receiving Clerk's copy may be ruled for entering receipts of goods thereon. Provision is made for noting the Purchase Requisition No. Each order will need to be signed by a suitable authority, frequently by the General Manager—a rubber stamp endorsement is assumed for identifying the signature. The Buyer should see that every order is acknowledged and delivery conditions accepted. The General Stores will take over the following-up of each order as to delivery. Size of form may be $6\frac{1}{2}'' \times 8''$, or even letter size with advantage.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-16.

5-16. WORKMAN'S ENGAGEMENT FORM.

W. BLANK & CO. LTD., London.

Date.	Dept.	Check No.
....	....	....
		New Nos.
....	....	....
....	....	....
....	....	....
....	....	....

Time of starting........................

Name in full........................

Age (if under 21)..................years on..................19........

Married or Single.................................Trade........................

Where apprenticed........................

Particulars of Last Employment.

Employer's Name in full........................

,, Address ,, ...

....

Capacity in which employed........................

Foreman's Name........................

Dept.........................Check No........................

Rate of Wages { ......per hour. ......per week of......hours. ......per day of......hours.

Length of service...........Date of leaving........................Cause........................

I certify the above particulars to be correct, and seek employment subject to the regulations in force at these Works.

Official copies of all Works Regulations affecting workmen may be seen at the Gatehouse or at Foreman's Office.

Signed..Applicant.

Particulars of Previous Employment, if any, at these Works.

Dept.	Check No.	Last Rate.	Length of Service.	Date of Leaving.	Cause.	Ability.	General Conduct.	Time-keeping
....	....	....	....	....	....	....	....	....

I recommend that the above named applicant be engaged as a........................

commencing at the rate of..............per week of 53 hours.

Signed..............................Foreman.

Normal Rate

....

Approved by Works Manager.

Character written for..............................Received..............................

(Not required for men employed here within previous 6 months or for Apprentices).

Insurance Cards received in good order.

Health.	Unemployment.

Discharge Note (upper portion) attached here.

Wages Advices attached here.

Advanced in rate........................

....

....

....

....

Character sent to..............................on..............................

This form will be made out under the direction of the Wages Office, and, after approval of Works Manager, will be filed under the man's name, with a cross index under check Nos. Size of form may be 10″ × 8″, doubled in half for filing in card cabinet, the name being written on the back accordingly.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-17.

WORKMAN'S CHARACTER REPORT.

PRIVATE AND CONFIDENTIAL.

EFFICIENCY WORKS,
MAIN ROAD, LONDON.

....

DEAR SIRS,

The undermentioned has applied to us for employment, giving the particulars stated below concerning his service with you.

We shall feel greatly obliged if you will be good enough to confirm or correct the applicant's statement and to fill in the further confidential particulars requested—returning this form at your earliest convenience, if possible per return of post.

Thanking you in advance.

Yours faithfully,
For and on behalf of
W. BLANK & CO. LTD.,
S. BROWN,
Works Manager.

APPLICANT'S STATEMENT.	CONFIRMATION (✓) OR CORRECTION.
Name..	
Dept..................Check No......................Age......................	
Foreman..	
Capacity in which employed....................................	....
Length of Service...................Date of leaving....................	....

CONFIDENTIAL PARTICULARS.

Rate of Wages......................per week of.........hours..

Cause of leaving...

Ability as workman...

General Conduct and Industry...

....

Timekeeping..

Is Applicant at present in receipt of compensation ?...

....

Date..Signed.......................................

These reports will bear a return address on the back and be sent out stamped for reply—or, preferably, with a stamped addressed envelope marked "Works Manager." A space is indicated at the foot of the form, in which the Works Manager will indicate his approval of the character received. Size of form should be same as Engagement Forms (5-16), and be ultimately attached to same.

5-17.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-18.

5-18. *101*

..................Check No.............

Present Rate.......Proposed............

To date from..............................

Transfer from Dept.......................

Suspended for...............................

5-18 WAGES ADVICE SLIP. *101*

W. B. & CO. LTD.

Concerning Workman.........................Check No..................

	Present Rate.	Proposed Rate.	To date from.
Wages Advance recommended.			
Transfer from Dept.			
Suspended on account of			
(Tool Clearance Ticket issued.)			

Wks. Mgr.'s Signature	Foreman's Signature.	Date.

These slips will be made out by the respective foremen and passed to the Wages Office, who will submit them to Works Manager for approval, accompanied (when an advance in pay is in question) by the man's Engagement Form and Rate Sheet, thus informing the Works Manager fairly fully of the man's record to date. In the case of transfers, which should be reported by the Foreman of the Dept. receiving the man, the Tool Stores and Foreman will need to be advised by the Wages Office as to the man's new check No. The form is arranged for a counterfoil record, to be kept by the Foreman, though a carbon copy would be quite feasible. Size of form should suit space provided on the Engagement Forms, say, 2½″ × 6″. The slips and counterfoils are numbered. See Form 5-21 as to Tool Clearance Ticket.

5-19.

5-19. WORKMAN'S RATE SHEET.

W. B. & CO. LTD.

Year.	Name.	Check No.

NOTES *re*-INSURANCE STAMPS, EXEMPTIONS, ETC., AND APPRENTICES' ADVANCES.

Check No.	Wages Week No.	Rate.	Insurance Stamps.				Absence.		Extra Pay.	Total Earnings.	Hours Lost.	Omission to Stamp Time Card.	Notes.
			Workman.		Employer.		T. F.S.	M. T.W.					
			Health.	Unemp.	Health.	Unemp.							
	1												
	2												
	3												

This sheet is designed to serve in the first instance as the office register for checking the rates and insurance stamp values as entered on the Wages Sheets. In the latter case variations from regular values will have to be verified by the person checking, and the amended value entered in register in red ink. Otherwise a tick for each week serves to continue any rate or stamp value and to confirm that stamping was involved. See discussion, Section III b. There is thus built up a clear record for claiming Unemployment Refund from the Insurance Commissioners. Pending changes in contributions owing to passing of age 16 can be indicated against the week No. first concerned, thus obviating oversight. It is convenient to extend the functions of this sheet to include a record of Time Lost and Extra Pay each week for administrative purposes and a record of Total Earnings each week for Accident Compensation purposes, as well as for general survey by the Works Manager. A column is provided for Check No. in case of changes during the course of the year. The Check No. at head of sheet would then be altered, and the sheet moved into corresponding sequence. The use of Wages Week Nos. allows them to be printed in for any year, and a table will give the corresponding week ending date. The form should be printed to give 52 weeks in two sets of 26 on the one side only of the sheet. Size of form may be 8½″ × 11″. Margin at side for filing.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-20.

5-20. **WORKMAN'S DISCHARGE NOTE.**

W. B. & CO. LTD.

Timekeeping..............

Length of Service..........

Notes as to re-employment, etc.

....

....

Works Manager.

TO THE WAGES OFFICE. Date..................................

Please pay off Workman..................................Check No....................

at......................to-day (Tool Store Chargehand notified).

Capacity in which employed..................................

Reason of Discharge..................................

Ability as a Workman..................................

General conduct and industry..................................

At least one hour's notice should be given to Wages Office. ....Foreman.

PAYMENT DUE.

TIME.	DATE.	NAME.	CHECK NO.

Tool Clearance Ticket must be obtained and attached here before payment is made.

For Week No.......... ending.................. } Time Wages.........hrs. @....

Extra Pay..........................

....

Less Insurance (Workman's) Health Unemp.

Insurance (Employer) Health Unemp.

Certified..............................Wages Clerk.

Checked and Paid by ....Received by............

INSURANCE CARDS RECEIVED.

Health.	Unemp.
....	....

These Discharge Notes are made out by the Foreman as to the upper portion, except as to the left-hand side, which is filled in by the Wages Office. This upper portion is detached by the Wages Clerk before submitting same to Works Manager, and only the lower portion is seen by the workman when being paid. A Tool Clearance Ticket (5-21), when received, must be attached as indicated. Size of form to suit space provided on Engagement Form for attachment of upper form, say, 2½″ × 7″ for each portion, or 5″ × 7″ in all.

This form may be used, as to the lower portion, for paying off suspended men. The upper portions would be left blank and destroyed.

The Cashier will receive the "payment due" voucher from the Wages Office, and only pay out on presentation by the workman of his time card. The vouchers, after payment, may be mounted in a guard book for reference.

5-21.

5-21.

W. B. & CO. LTD.

TO THE TOOL STORE CHARGEHAND. Dept.......

....................................Check No....................

is leaving at.........................to-day.

is to be suspended at..................to-day.

Please therefore look into his tool account and see that all is satisfactory before issuing attached Tool Clearance Receipt to him on his applying for same.

Date....................Signed..............................

Foreman.

5-21. TOOL CLEARANCE TICKET.

W. B. & CO. LTD.

TO THE WAGES OFFICE. The tools booked out on loan to..........................Check No............ have, with the following exceptions, been returned.

	Value.
Total Amt. of Wages to be held back.	

Date....................Signed..............................

Tool Store Chargehand.

This ticket is designed so that the Tool Store Chargehand may have the necessary advice before any man leaves, and be prepared with the Tool Clearance Receipt at the appointed time. The workman should be informed by his Foreman as to leaving or suspension, and should apply accordingly for a Tool Clearance Ticket. Size of form to suit Discharge Note, say, 2½″ × 7″, perforated down centre.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-22. TIME CARD. 5-22.

NAME. CHECK NO.

....

WEEK NO. ENDING WEDNESDAY.

....

ONLY CLOCK STAMPING WILL BE RECOGNISED.

Day.	Lost Time.							
		A M	Before Break-fast.	After Break-fast.	After Dinner.		Wages Office will fill these in	
		P M		After Tea.		On Finishing.	Hours Worked.	Over-time Allow-ance.
			IN	IN	IN	OUT		
Th.		A M						
		P M						
F		A M						
		P M						
S		A M						
		P M						
Su		A M						
		P M						
M		A M						
		P M						
Tu		A M						
		P M						
W		A M						
		P M						
				TOTALS				

This card is issued again on Fridays as a Pay Card.

W. BLANK & CO.
LTD.

Check No.....................

Night Shift Stamp-ings.	A M				
	P M		On Starting.	After Supper.	For Supper.
	A M				On fin-ishing.
Late Dinner Hour.	A M				For dinner.
	P M	After Dinner.			
		In.	In.	In.	Out.

All Overtime must be authorised by an Overtime Ticket unless whole department *working late.*

This Time Card is shown with the reverse side alongside the front of the card. The notes incorporated in the design as to the application of the " clocking " spaces are not usually necessary, and are only inserted by way of demonstration. A rubber stamp endorsement on the back of the card (right-hand view) will serve for entering any deductions from pay when card is used as a Pay Card. Extra Pay Slips can be attached by stapling, giving details of Extra Pay and Special Allowances. The segment at top of card is to indicate which side out for stamping, and affords distinction if different coloured inks are used in lieu of coloured cards. Size of card to suit time recorder (say 7″ × 3½″).

5-23. OVERTIME TICKET. 5-23.

W. B. & CO. LTD.

Date.....................

This is to authorise and instruct Workman,
Check No..............................to work overtime
till...............p.m. on Order No.........................
....
Signed............................Foreman.

As indicated on Time Card above, Overtime Tickets are necessary for authorising all overtime, other when the whole dept. is working late. The tickets will be handed to the Gatekeeper serving as a gate-pass. Size of form, say, 2½″ × 3½″.

5-24. WORKMAN'S GATE-PASS. 5-24.

W. B. & CO. LTD.

Date.......................

This is to authorise Workman, Name...............
....Check No.............
to pass..................................at.............................
Business ....
A.D. Ref.......................................Foreman.

Passes for men leaving early or arriving at unusual hours are necessary for effective gate control. Size of form, say, 2½″ × 3½″. Colour should be distinguishable readily from Overtime Ticket.

A.D. Ref. means Advice of Despatch No. when man is sent to an Away Job.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-25. JOB ADVICE SLIP.

W. B. & CO. LTD.

Dept.............Check No...........

Change of Job.	Sub. Order No.	Part No.	Operation.	Machine No.	Strike out words that do not apply.
OFF					Finished. Interrupted.
ON					Start. Restart.

TIME AND DATE.	Signed.
ADJUSTMENT ASKED FOR.	.... Workman.
INSTRUCTION TO WAGES OFFICE.	Signed ....

5-25. These slips are made out by the men at each change of job, and deposited in suitable boxes for collection at short intervals by the Chargehand, who approximately confirms times and sends to Ratefixer. Re-start Slips may pass direct to Wages Office. Adjustments in respect to hard material, faulty tools, etc., or preparation allowance for a re-start will be dealt with on this slip by the Ratefixer or perhaps by the Foreman. A Time Recorder may be utilised for stamping time and date, preferably at the Chargehand's desk.

Job Ticket Nos. are avoided, and reference made to Sub-Order Nos. only on the assumption that the Sub-Order batches will not be further split up in working.

Size of form may be 2½" × 3½". Distinctive colours should be used for Machine Work and Hand Work.

5-26. JOB TICKET.

W. B. & CO. LTD.		Sub Order No.
Description.	Dwg. No.	Office Order No.
Part No.	Pattern Mark.	Quantity.

Operation.	Preparation Time per Batch.	Operating Time per Piece.	Total Time Limit.
....			

STAGE TICKET (5-97)
ATTACHED HERE.

Check No.	Wage Rate.	Mach. No.	Week No.	Hrs. Worked.	Less Adj'm'ts.	Time Counted

EXTRA PAY DUE.

AVERAGE TIME TAKEN PER PIECE.	AVERAGE NO. PIECES PER HOUR.

5-26. Job Tickets are made out by the Ratefixer or his assistant from the Job Advice Slips as far as possible, and confirmed by reference to the job itself, which will be necessary for passing the time limit.

The amount of descriptive information required will vary according to the sufficiency of a Part No. or A.U. Ref. by itself.

The Job Tickets and Job Advice Slips are passed as quickly as possible to the Wages Office—the slips being there utilised for making up the Weekly Time Allocation Sheet (5-28).

The completion of each Job Ticket involves receipt of a Stage Ticket (5-97) with particulars of quantities passed as correct. The Stage Tickets are attached to the respective Job Tickets.

Provision is made for entering up the time worked, and this ruling may be continued on the back of the card.

Adjustments of the time worked in respect to the time counted against the time limit must be authorised by Job Advice Slips. The ruling for entering the extra pay due will depend on the plan adopted for calculating same.

The averages indicated at foot of form are for Job Data purposes. Only one average need usually be worked out.

The Job Tickets may require to be numbered for identification purposes, but this will hardly be necessary if a sub-order scheme is adhered to. Size of form may be same as Time Card (5-22).

COMMENTS AND NOTES FROM OTHER SOURCES.

5-27.

5-27. DAILY TIME SLIP. Date.........
W. B. & CO. LTD.
Mach. No.......Wk. No.........Check No.......

Sub Order No.	PARTICULARS OF WORK DONE.	Time On.	Time Off.	Hours on Job.
Entered.	Passed.	Above is Correct.		
Wages Office.	Foreman.	Workman.		Total.

Daily Slips on these lines are necessary for allocating the time of men on short jobs or on work for other reasons not amenable to Job Advice Slips (5-25).

The particulars given are summarised on Weekly Time Allocation Sheets in the Wages Office, when overtime allowances can be dealt with and a certain amount of discretion used in finally allocating the time as booked by the workman.

Size of Slip may be $2\frac{1}{2}'' \times 3\frac{1}{2}''$, made up in pad form for issue to the men concerned ready numbered, etc., or possibly distributed daily when collecting the previous day's slips. Attention must be given to ensure that the slips are filled in promptly at the changes of job. Colour of form should differ from Job Advice Slip.

5-28.

5-28. WEEKLY TIME ALLOCATION SHEET.
W. B. & CO. LTD. WEEK NO.....................
Process............................Name..........................Wages Rate...................Check No.................

Unfinished Job. Hours Brot. For'd.	Sub Order No. or A/c Ref.	Part No. or Particulars of Work done.	Line 1. Time ON ,, 2. Hours worked ,, 3. Overtime Allowance ,, 4. Time OFF						Hrs. wk'd on Job.	O'time All'ce	Wages Allocation.				Machine No. and Individual Shop Charge Rate.	Shop Charges.	Total Hours on Job to date.	Job Finished.
			Th.	F.	S.	M	Tu.	W.			Over-time Charges A/c (S 6-3).	Order Series A B. C. Sale.	Order Series D.N.R.S. Non-Sale.					

These sheets may be headed by a mechanical addressing machine.

The sheet is designed to serve several functions. Firstly, the times "ON" and "OFF" as derived from the Job Advice Slips are entered in the spaces provided. This allows a ready survey that the changes of jobs as notified exactly cover the week's time. The hours to be accounted for each day are derived from the Time Cards, and entered at the top of the column for each day's time in the spaces provided. The Wages Office have to complete these sheets, and will learn from the Job Advice Slips if job is finished, so that the time to date on Unfinished Jobs can be carried forward to the next week's sheets. This arrangement will provide figures for booking the time on the Job Tickets. Some bookings may come from Daily Time Slips.

The treatment of Overtime Allowances may be by allocating to orders or to a special account (see discussion). The provision made on sheet provides for either course as occasion demands. Analysis is provided for the Wages Allocation of the Direct Wages (as distinct from Overtime Allowances) under two headings of Sale and Non-Sale. This will allow some useful figures to be built up on the Departmental Time Allocation Summary. The provision made for Shop Charges allows for the use of individual rates for each producing unit (see discussion), or for flat departmental rates, applied preferably as an hourly rate or burden. Size of form may be $7'' \times 10\frac{1}{2}''$. Distinctive colours, as adopted for Job Advice Slips, and Daily Time Slips, should be used for Machine Work and Hand Work. Secondary Labour, such as Inspection on the one hand, and unskilled labour on the other, may be entered on white sheets.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-29. EXTRA PAY SLIP. 5-29.

W. B. & CO. LTD.

Process.	Week No.	Check No.
Sub. Order No.		

The results of each job as recorded on the respective Job Tickets are summarised each week under each man's No. on these slips. The total extra pay due for the week is entered in the outside column. The slips are arranged in perforated strip form and for a carbon copy to be taken. From this copy the individual totals are entered on the Wages Sheets. Grand totals are made on the carbon copies for checking against the Wages Sheet grand totals. As the Works Accounts Office require the carbon copies for cost allocation purposes, folded loose sheets are preferable to the carbon copies being fast in a book. Colour scheme suggested for Job Advice Slips should be followed. Size of slip may be 2½″ × 3″ for attaching, by staple, to the Time Card. Similar slips may be utilised for recording Special Allowances. Jobs on which the Time Limit is exceeded should be entered on Excess Time Slips arranged on these lines and duly issued to the men.

5-30. DEPARTMENTAL WAGES ALLOCATION SUMMARY. 5-30.

W. B. & CO. LTD. Figures below assumed efficiency level underlined in red.

WEEK ENDING.............. WEEK NO............

Order Series.	Wages Divisions.	Dept.	Dept.	Dept.	Dept.	Dept.	GROSS TOTALS. Wages Divisions. Machine.	Hand.	Secondary	Order Group
SALE A.B.C.	Machine Hand Secondary									
NON-SALE D.N.R.S.	Machine Hand Secondary									
PROCESS PRODUCTS	Machine Hand Secondary									
SUNDRIES	Machine Hand Secondary									
	Total									
OVER-TIME ALLOW-ANCES	Machine Hand Secondary									
	Total									
EXTRA PAY	Machine Hand									
	Total									
SHOP CHARGES	Machine Hand									
	Total									
HOURS WORKED	Machine Hand									
	Total									

SUMMARY READY.
Time................
Date................
Certified
Noted
....
Works Manager.

This summary is arranged to facilitate agreement between the wages allocated and wages paid. The figures as to allocation are derived from the individual Weekly Time Allocation Sheets by mechanical means—any other method being prohibitive in time and cost. The functions of the summary are discussed under Works Accounts. Certain other functions are possible in giving the Works Manager a survey of the works activities in terms of money, and particularly to indicate abnormal conditions antagonistic to commercial efficiency. Size of sheet must depend on number of departments to be provided for.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-31. *5-31.*

WAGES SHEET.

W. B. & CO. LTD.

(PAY............SHEET............) WEEK ENDING............WEEK NO.............

Dept.	Check No.	Name.	Capacity in which employed.	Hours.	Wages rate.	Time Wages.	Extra Pay.	Special Allowances.	Gross Wages.	Deductions. Fines.	Insurance.		Net Wages.	Insurance.		Stamps.					
											Worker.			Employer.		Health.			Unemp.		
											H'lh.	Un.		H'lh.	Un.	D 5	D 6	D 7	D 2	D 4	D 5

In view of the number of totals involved, it is better to total each sheet separately and summarise on another sheet—grouping the sheet totals to correspond with the pay sections, as paid at one pay station, the sheets being marked at head accordingly. The number of lines on each sheet should agree with the number of Pay Tin Slips (5-33) in one sheet. To allow of advance writing up of sheets as to check Nos. of names and rate (an addressing machine may be used), new men should be entered at the tail end of the department for the first week. The wages paid before the usual time (*e.g.* to men leaving) should be entered on a separate sheet, and not made up with the ordinary wages. Size of sheet may be 14½″ × 10¾″, used on one side only, and held in binder (possibly separate for each fortnight).

5-32. *5-32.*

WAGES ABSTRACT.

W. B. & CO. LTD. WEEK ENDING.................WEEK NO......................

Discharges interlined in black ink. Away Time noted at foot but paid through Petty Cash.

Dept.	No. Absent.	No. Working.						Time Wages.	Extra Pay.	Special Allowances.	Deductions (in red).	Dept. Total (for allocations).	Insurance.
		Men.	Juniors.	Assistants.	Total.	Increase.	Decrease						Employer's Contributions.

This abstract requires to be submitted to the Works Manager and General Manager. It must agree in total with the summary of the Wages Sheets as made up for pay purposes, with the inclusion of all wages paid before the usual time. The Dept. Totals will ignore deductions made on behalf of the workers' insurance contribution. These totals are used for checking the wages allocations. Size of form should agree with Wages Sheets or of letter paper according to method of filing.

5-33. PAY TIN SLIP. *5-33.*

W. B. & CO. LTD.

CHECK NO...........

Net Wages

These slips are arranged in sheets, the quantity agreeing with the number of lines on the Wages Sheets. The net wages as entered on the slips are totalled and compared with Wages Sheets. When in order, the slips are separated and the pay tins made up from them and the slips put in the tins (see discussion). Notes may be made on slip of any fines, amounts overpaid or paid short, etc. Size of slip to suit pay tin.

5-34. *5-34.*

UNCLAIMED PAY REPORT.

W. B. & CO. LTD. PAY..................................6 p.m., Friday..........................

To be filled in by Pay Clerk at end of pay and handed to Cashier with money in pay tins. Pay Clerk and Cashier to sign. Time Card to be obtained by Workman from Wages Office and handed in when pay is claimed. After Monday night, remaining pay tins emptied and Special Pay Ticket required from Wages Office to claim pay.

Check No.	Name.	Notes, as on Pay Tin Slip.	Amount Unclaimed.	Date Paid.	Received by (if paid out on Time Card) or Voucher No. of Special Pay Ticket.	Cash Folio.

The notes embodied in form sufficiently explain routine. Size of form may be 5″ × 8″, with carbon duplicate (unprinted).

COMMENTS AND NOTES FROM OTHER SOURCES.

5-35. 5-35.

SPECIAL PAY TICKET.

W. B. & CO. LTD.

Payable at.........o'clock on..................for Wages Account, Week No..................ending..................

TO THE CASHIER. Please pay to Workman.................................Check No..................
Postal Address..

	£	s.	d.	
Extra Pay (not made up at time of discharge) as per slip	......	......	......	Voucher No.
Away Time as per time sheet attached....................................	......	......	......	
Current Week's Wages (in advance of regular pay), on production of Time Card	......	......	......	
Wages unclaimed (on production of Time Card)..............................	......	......	......	TOTAL. £ s. d.
Cash to be accounted for (Passed..........................Works Manager)	......	......	......	: :

CERTIFIED BY	PAID BY	RECEIVED BY
....................Wages Clerk	....	....

This ticket serves for the Wages Office to control works payments without handling any cash. Money required in advance for men going away, etc., is authorised by the Works Manager, the Wages Office having to see that an Away Expenses Sheet is submitted for settlement in due course. Size of form, say, 5″ × 8″, with carbon duplicate (unprinted).

5-36. 5-36.

AWAY EXPENSES SHEET.

W. B. & CO. LTD.

Receipted Bills are required for all payments other than fares not covered by allowance. Expenses must be settled immediately on return to Works.

Name.................................. Check No..........................
Where working..
Date out..........................Date of return..........................

Date.	Order No.	Details of Expenses.	Fares.

Workman's Signature	Cash advanced	Checked	Material accounted for	Passed
....	....	.........Wages Office	..................Warehouse	.... Works Mgr.

The Wages Office will issue these sheets as money is advanced for Away Expenses, and when workman returns, must see to prompt settlement. When Works Manager has passed sheet (reference having been made to Warehouse as to materials had for job), the Wages Clerk will accompany man to Cashier and obtain a clearing signature on his carbon copy of Special Pay Ticket for cash to be accounted for, which may be then handed to man. Size of form, 5″ × 8″.

5-37. 5-37.

AWAY TIME SHEET.

W. BLANK & CO. LTD.
EFFICIENCY WORKS,
MAIN ROAD, LONDON.

Telegrams : BLANKCO, LONDON.
Telephone : 000, LONDON.

Week No...............ending Wednesday..............................
Name..............................Check No..............................
Where working..

Date.	Order No.	Description of Work Done.	Commenced Work.	Ceased Work.	Length of Meal Time.	Hours Worked.	

Signed	Insurance	Our clients are respectfully requested to sign for our workman's time each week and on completion of work	Officer in charge at place of work.
.... Workman.	....	....	

The Gatekeeper must see to each man having an Away Time Sheet, when sent out, as evident from the Gate Pass, and advise Wages Office, who will continue the matter. Each time sheet will need to be passed by Works Manager, and payment authorised by a Special Pay Ticket. After payment the sheets may pass to the Works Accounts Office for filing. Size of form, 5″ × 8″.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-38. **ACCIDENT REPORT** (to be sent to Gate House in first instance). 5-38.

W. BLANK & CO. LTD., Efficiency Works, Main Road, London.

Injured Person.

Name in full.. Check No..............

Private Address..

Age last birthday...

Capacity in which employed...

Employer's Name if working for outside firm...................................

Report No.

Duration of Disablement.

Average Weekly Earnings.

Total Compensation.

Accident.

Date.......................Time.......................Place.......................

Particulars of Injury...

....

....

How caused...

....

....

Note.

Where plant or Machinery has given way, it must be preserved and, as far as possible, retained in position as at time of accident for inspection by Works Manager, who will instruct further as to disposal.

Was machinery in motion by power at time of accident ?..........................

By whose negligence, if any, was accident caused ?...............................

Witnesses of Accident..

Precise occupation of injured person at time of Accident........................

....

Time he commenced work on day of accident.......................................

Time he ceased work on account of accident..

Place to which removed (if unable to resume work after attendance at Gate House)

....

Name of Medical Man in attendance..

Probable duration of disablement...

Date Notices Sent.

Factory Inspector ....

Certifying Surgeon ....

Insurance Co.

1st Notice...............

Claim...............

2nd Notice...............

Remarks as to Machine Guards...

....

Entered in Home Office General Register ....

Date reported.......................Signed.......................Foreman in charge

Passed.

....

Wks. Mgr.

Date work resumed..

The respective foremen are responsible for preparing these reports, though, with an Ambulance Room at the Gate House, the Gatekeeper will be able to assist, if need be. A diary requires to be kept at the Gate House of all ambulance aid given, and omission of Accident Reports may be avoided by making the Gatekeeper responsible for seeing that a report comes through for each case requiring it. The reports will be passed to the Wages Office for dealing with notices to Factory Inspector, Certifying Surgeon and Insurance Co. The requirements of the last-named may affect the details of the report. Size of form may be 10″ × 8″.

The Factory General Register, in which notifiable accidents (involving one day's absence) have to be entered, together with various details relating to Young Persons and Children, Lime-washing of Buildings and Steam Boiler Inspection, may very well be kept by the Gatekeeper.

Dangerous Occurrences, not involving personal injuries, are supposed to be reported to the Factory Inspector.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-39. STANDARD FITTINGS SHEET. *5-39.*

W. B. & CO. LTD

Class of Article... Ref. No. S.F.......................................

Description ....

Maker (if Specialty)..Material..

OUTLINE SKETCH.

Sub-Mark.	Drawing No. or Maker's Ref.	LEADING DIMENSIONS.						Notes.	Fin'd Weight.	Stock Mark.	Date Added.	Edition No.
		a	b	c	d	e	f					
A B C D												

These sheets are intended for tabulating all fittings locally standardised for design purposes. Where any item is held regularly in stock, an asterisk should be placed under Stock Mark, together with the date of adding the item to stock. The column for Edition No. is to identify the prints as issued for new items. The Sub-Mark is the letter affix used with the S.F. No. The original form requires to be on tracing cloth (for photo-prints), adapted for filing in a Design Reference Book.

5-40. DESIGN COMPARISON SHEET. *5-40.*

W. B. & CO. LTD.

Name of Component...Design Class No...................

OUTLINE SKETCH.

Part No.	Drawing No.	LEADING DIMENSIONS.						Notes.	Material.	Fin'd Weight.	Edition No.
		a	b	c	d	e	f				

This sheet is provided for tabulating the leading dimensions of similar components as a guide to future design—the form being on tracing cloth, with a view to photo-prints being placed in each draughtsman's Design Reference Book. The value of the scheme depends on readily finding the sheet required, and to this end a classification system is necessary. This may be the same as that adopted for filing Job Data. With a unit system of drawings, the prints themselves may be classified, and would only necessitate a tabulation of sizes on these lines in a comparatively few instances.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-41. *5-41.*

COMPONENT REGISTER.

W. B. & CO. LTD.

Series............../............................

Part No.	Name.	Design Class.	Part No.	Name.	Design Class.
00			50		
01			51		
02			52		
03			53		

This is a register from which Part Nos. are taken as required. The plan is for a series No. to be adopted for each year, thus 13 for 1913, followed by serial Nos., commencing at 1 each year. The form is drawn for one hundred numbers per sheet, thus allowing the last two digits to be printed throughout. If the Part No. is not synonymous with the Drawing No., a column requires to be added for giving the latter. The need for a Design Class Reference depends on the manner of filing the Component History Cards (see below). The register sheets are made in the first instance on paper suitable for obtaining photo-prints of same size as Assembly Lists (5-48) for supplying copies to Works Office, Work Depot, etc.

5-42. *5-42.*

COMPONENT HISTORY CARD.

W. B. & CO. LTD.

Name..Design Class No......................................

	Part No.	Notes.	Mat'l.	Fin'd Weight.	USED ON			Alleged Faults.	Instructions.
					Type of Product	Assembly Drawing.	Assembly List.		
Designed Date									
Modified Date									

This card is arranged to serve as a name index under the specific Design Class No. This brings together all components of similar description, whereas alphabetical sequence is very liable to prove misleading. To locate more readily the groups of similarly-named components, the class Nos. may be subdivided. A further point is that the classification may be largely independent of names or purpose of parts, *e.g.* bushes of all kinds. The Component Register given above provides the necessary cross-reference to this classification. Provision is made for indicating the change of Part No. consequent on any modification of the original design. The association of these modifications on one card is invaluable for specifying correct replacements of superseded designs. Provision is also made for recording faults as reported from the Manufacturing or Repairs Dept., and instructions as to future orders or as to part to be used on repairs. Size of card may be 5″ × 8″, with continuation cards hinged by linen strip on the bottom edge of the card—giving the whole record without turning over. The finding of cards will be facilitated by having a tab projection at the top of each, on which the type of product or other convenient key reference is indicated.

5-43. *5-43.*

REPORT OF PARTS COMPLAINED OF.

W. B. & CO. LTD.

Date...

Type of Product.	Progressive No.	Customer.	Part No.	Name of Part.	Complaint and Remarks.

These reports will be sent to the Drawing Office by the Repairs Dept. as to work actually examined, and possibly made out in the Drawing Office as to complaints by post from customers, though an independent office is preferable. The particulars as to Part No. may have to be deduced from the information available—a straightforward matter if the Progressive No. is quoted. Size of form may be 5″ × 8″.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-44. PRINT INDEX CARD.

W. B. & CO. LTD. **Drawing No.....................**

Sent to	Date Issued.	Date Re-called.	Sent to	Date Issued.	Date Re-called.

5-44. This card is arranged to provide a record of all prints issued of any drawing. Similar cards of distinctive colours are advisable for issues to Works, to Suppliers for purchasing purposes, and to prospective Customers. A line entry is necessary for each print, and the recall should be noted and re-entry made when prints are only temporarily recalled. Size of form may be $4'' \times 6''$.

5-45. PRINT DELIVERY TICKET.

W. B. & CO. LTD. **Separate line for each copy.**

Drawing No.....................

TITLE

A.U. Ref.....................

Date Issued.	For Order No.	Dept.	Received by	Date Returned.	Recall Ticket.

5-45. This ticket serves as a delivery ticket of prints issued to the Works. The tickets are arranged in book form for a carbon copy to remain, on which Works Office will initial for receipt. The ticket is then filed as an index card of prints in Works. Identical tickets of distinctive colour will serve as between Works Office and Works Drawing Stores, or possibly Pattern Shop.

Similar cards may be used for Assembly Lists. Size of form may be $2\frac{1}{2}'' \times 3\frac{1}{2}''$, printed four deep, with fast carbon copy.

5-46. PRINT RECALL TICKET.

W. B. & CO. LTD. **Ref. No.**

Date......................... **Drawing No.....................**

TITLE					**Order No.**		
Reason of Recall.		**Authorised.**			**Estimated Time of Re-issue.**		
Copies to be returned	1	2	3	4	5	6	7
Received back by							

5-46. These tickets are dealt with after the same manner as Print Delivery Tickets, as between Drawing Office and Works Office, and again as between Works Office and Works Department. The routine tends to check inconsiderate recall by the D.O., and helps to remind that the recall of drawings suspends production. After recall is entered on the Print Delivery Ticket (Works Office Copy), the Recall Ticket is sent to View Room to hold against return of print.

Size of form may be $2\frac{1}{2}'' \times 3\frac{1}{2}''$, printed four deep, with fast carbon copy.

5-47. DESIGN SUMMARY. *5-47.*

W. B. & CO. LTD.

General Description.

Type Ref.	Design Index No.
Code Word.	Gen. Arrangement Dwg.

Assembly Unit.	Assembly Drawing.	Title.	Units per complete product.	Office Order No. Quantity. Progressive Nos. Name Plates. Inspection. Production Instructions. Delivery.	▨
A.U.					

These summaries are essentially lists of assembly drawings pertaining to each order. Where designs are repeated at all, the summary can be on paper suitable for blueprinting, with a space blocked out (shaded in illustration) for those particulars that vary for each order. A Design Index No. is given to each complete design or specific combination of Assembly Units, and the least variation in design as between one order and another must involve a new Index No. This has the effect incidentally of emphasising that much so-called repetition work is not strictly repetition. Size of form should correspond with Office Order (5-12).

COMMENTS AND NOTES FROM OTHER SOURCES.

5-48. ASSEMBLY LIST. *101* W. B. & CO. LTD.	Set.......... Sheet.........	Assembly Drawing No.	Assembly Unit. A.U.	*5·48.*

	Line No.	Detail Dwg. No.	Part No.		Standard Fittings Ref.	Pattern Mark.	Name of Part.	Material.	Purchase Spec. No.	No. per Assembly Unit.				
										Castings.	Forgings.	Stampings.	From Bulk.	Bought Finished.
Quantity Slip (5-53) Superimposed here.	—				S.F.									
	1													
	2													
	3													

This list is intended for reproduction by photo-printing, and the information on each sheet is permanent to the respective A.U. References, any change whatever in detail involving a new list under a new A.U. Ref. The serial Nos. printed on each sheet are for purposes of correctly pairing with the Quantity Slips, and provides a convenient reference for filing the original sheets. Space is provided for marking the number of sheets making up the set for the respective A.U. Ref., thus 1, 2, 3, 4 and underneath is written the sheet No. in question, *e.g.* 3. The Detail Dwg. No. will not usually be quoted if the component drawings are in unit form, bearing only the Component or Part No. The Standard Fittings Reference will only arise for details not bearing a Part No. Such items may be conveniently considered by the Drawing Office as bought finished, the question of whether same have to be made specially or bought specially or taken from stock being left for settlement in the Works Office in making up the Quantity Slips. In the matter of Pattern Mark, this will only arise where components of a given Part No. are derived, as to casting or stamping, from a pattern bearing another Part No. The original Part No. is then quoted, with X prefixed, as the Pattern Mark (see discussion). A column is provided for entering the Purchase Specification No. appropriate to the material to be used. This allows of the maximum refinement in specifying material without loading the Assembly List. The arrangement shown for entering quantities per Assembly Unit under the headings of Castings, Forgings, etc., facilitates the use of the lists by Pattern Shop, Smithy and other Works Departments. The column headed " From Bulk " has reference to items made from bulk material, such as Metal Bar, Sheet or Tube, Timber, Fibre, etc. Line Nos. are printed in to obviate errors in reading the Quantity Slips, which are attached in the Works Office to each Assembly List Sheet.

Size of form may be one-eighth Double Elephant Paper size, $9\frac{1}{2}'' \times 13''$, or thereabouts, to conform with a standard detail drawing size. While this size is a little large for office use, it allows more Assembly Units to be listed on single sheets, and is convenient for mounting as a shop drawing for loan to Fitting Shop—the Quantity Slip being omitted from such prints.

5-49. **PRODUCTION INSTRUCTION.** *5·49.*

W. B. & CO. LTD.

No..................................Date..................Office Order No......................

Short Particulars.

Issued to Depts..............................Signed..........................Passed.................Wks. Mgr.................

These instructions are typewritten in the Drawing Office for issue to Works Office, Inspector, etc., and deal with matters outside the range of Assembly List, Design Summary or Erecting Card. Also used when a Sales Order Ref. is used as a Production Order No. (letter P added). It may be used for advance instructions to Pattern Shop, and contain sketches. Size of form same as Office Order (5-12).

COMMENTS AND NOTES FROM OTHER SOURCES.

5-50.

5-50.
W. B. & CO. LTD.

ERECTING CARD.

Date Card issued..Office Order No............................
Date Work due...Item No......./...............

Short Particulars.	**Type of Product.**	**Design Index No.**

Assembly Unit. A.U.	**Description.**	**No. of Units per complete product.**
Extras.		

Style of Finish.	**Name Plate.**	**To be finally inspected by**

Erecting Sub-Order.	Progressive No. appropriated.	Works Inspection Certificate No.	Date	Packed by

These cards constitute erecting specifications appropriate to the respective Sales Orders. The Design Index No. may only hold good as to combination of assembly units, provided that the extras enumerated may be added at the erection stage. Variations from standard that affect the assembly units are considered as an integral part of the design, and will not figure as "extras" on these cards. Where a Sales Order calls for more than one complete product, the Erecting Card for each item is identified by numbering with the consecutive No. and the total quantity, thus 3/12 would mean the third item out of twelve required. In certain circumstances this may serve as a Progressive No., but if the product (without extras) is obtained from stock, *i.e.* made under a Stock Manufacturing Order, there will be an independent progressive No., which will be appropriated when the Erecting Sub-Order is issued. An Erecting Sub-Order can, if need be, cover more than one item on a Sales Order, though separate Erection Cards are necessary for accompanying each item to inspection. Size of form should correspond with Office Order (5-12).

5-51.

5-51.
W. B. & CO. LTD.

SALES SUNDRIES ORDER SPECIFICATION.

Customer.	**Customer's Ref.**	**Date.**	**Order No.**

Parts to be marked.	**Inspector.**	**For Despatch with**	**Shipping Marks.**	**Date due.**

Quantity.	Description.	Part No.	Material.	Purchase Req'n.	Purchase Order.			Warehouse Memo.			Item ready.
					Ref.	Date.	Supplier.	Ref.	Date.	Notes.	

Specification issued by..............................Goods inspected by..........................Packed by..............

These specifications are advisedly made out in the Drawing Office from the Customer's instructions for issue to the Warehouse. The specification constitutes the official order. The Warehouse hold a certain stock of spare parts for filling these orders, and issue Warehouse Memos. to Works Office for parts required to complete. The Drawing Office may possibly issue the Purchase Requisition for goods that have obviously to be bought specially, and by entering the Purchase Requisition No. before issuing the specification, overlapping and misunderstanding is obviated. The Warehouse are responsible for collecting the goods. Size of form should correspond with Office Order (5-12). For Warehouse Memo. see Form 5-106.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-52.

5-52. **PRODUCTION PROGRAMME.**

W. B. & CO. LTD. Date of Order......................Office Order No............

Customer or Account

Short Particulars

Deliveries entered in red. ⊣ Indicates completion of any stage.

Stage.		Notes.	Week.	Week.	Week.	Week.	Week.	Week.
Drawings	Requirements	(5-106)						
	Date received	(5-45)						
Assembly Lists	,, ,,	(5-48)						
Design Summary	,, ,,	(5-47)						
Materials	Purch. Requisitions	(5-54)						
	Deliveries	(5-82)						
	Stock Appropriation	(5-55)						
Patterns	New Patterns	(5-49)						
	Casting Instructions	(5-69)						
Castings	Requirements	(5-53)						
	Deliveries	(5-71)						
Forgings	Requirements	(5-53)						
	Deliveries	(5-77)						
Jigs and Special Tools	Tools Provided Schedules	(5-58)						
	Tool Sub-Orders	(5-59)						
	Deliveries	(5-94)						
Machining	Sub-Orders	(5-103)						
	Deliveries	(5-100)						
Assembling	Sub-Orders	(5-101)						
	Deliveries	(5-99)						
Erecting	Sub-Orders	(5-102)						
	Deliveries	(5-99)						
Completion	Due	(5-12)						
	Deliveries to Warehouse	(5-108)						
	Stock Appropriation	(5-55)						
	Despatch	(5-112)						

This sheet is arranged to present a general summary of the position of an order at all times. Beyond that, it constitutes a record of the original planning of the due dates for each stage, having regard to the commitments and possibilities of each department for the respective weeks. The columns provided for the weekly expectations and realisations may be headed with a week No. or date of week ending. The sheet aims to present a true picture of the position from week to week, and to help prevent any stage being overlooked or unduly delayed. In the column headed " Notes " form references have been put in for the purpose only of explanations indicating the source of the information requisite to complete the records for each stage. The amount of detail that should be entered will depend on the conditions of the work. In some cases ticks to represent each item will be sufficient, with a cancelling stroke for deliveries. Drawing requirements refer to due dates agreed with Works Office by the Drawing Office. Size of form will depend on number of weekly columns to be provided.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-53.

5-53. QUANTITY SLIP. *101* W. B. & CO. LTD.	Assembly Unit. A.U.	Office Order No.

Line No.	Total Requirements (Finished).	Margin (Material).	Stock Appropriation.		Net Balance (Material).	Process Products.	Bulk Material.	Purchases.			Date Material Available.
			Ticket No.	Quan.			Requirements.	Reqn. No.	Date.	Deliveries Specified.	

These slips are made out by the Works Office (Production Section) in conjunction with the Design Summary (5-47) and Assembly Lists (5-48) supplied by the Drawing Office. The slips are superimposed on the Assembly Lists, the list and slip being numbered to facilitate pairing. There may be several slips for as many orders associated with the same Assembly List. Provision is made for specifying a margin of material to be put in hand with the actual requirements. This may be charged up to the order, but will be subject to control as reserve stock, from which appropriation will be made for replacements. The provision on the form for Stock Appropriations is to meet the case where a certain amount of material is already on hand. The column for Process Products is provided for indicating that the material requirements will be met in this way, viz. as castings, forgings or stampings. Bulk Material refers to bars, tubes, sheets and the like. The Purchase entries will have reference to materials requisitioned under the Office Order No. given. The date that material is available will be filled in by the General Stores as each item is completed as to material. Copies of these slips are supplied with the respective Assembly Lists to the manufacturing departments as well as to the General Stores and Work Depot, supplemented by Casting Instructions (5-69) from the Pattern Shop to the Foundry. Size of form to suit Assembly List.

5-54.

5-54. PURCHASE REQUISITION. W. B. & CO.	Date.	Requisition No.
Purpose.	Part No.	Office Order No.

Quantity.	Description.	Approx. Value.	Purchase Specification.	Delivery Requirements.

Dept. to whom goods are to be issued..

Purchase Order No.	Date.	Supplier.	Certified. Works Office.	Approved. Works Manager.

These requisitions are made out in carbon triplicate by the Works Office (Production Section), and, after approval by the Works Manager, the top copy is sent to the Buyer and the second copy to the General Stores. The General Stores may be required to confirm on each order that the required goods are not available from stock or from stock material on order. If the Drawing Office make out any requisitions, the General Stores copy must be first sent to the Works Office (Production Section) for noting on Quantity Slips and Production Programme (5-52). In any case the latter office should be consulted by Drawing Office as to delivery requirements. Requisitions for Tool and Plant purchases of ordinary items may be initiated by Tool Stores Chargehand, and the more special items requisitioned by the Works Office (Ratefixing Section) under direct instruction from the Works Manager. Size of form may be $6\frac{1}{2}'' \times 8''$.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-55.

5-55. STOCK APPROPRIATION TICKET.

W. B. & CO. LTD.

Date……………………No…………

For use on Office Order No………

(If for replacement) Viewing Report No……………

Quan.	Part No. or Description.	Material.	Present Stage.	Ex Office Order.
When goods are issued, cancel by crossing with date in crayon.	Signed………… ……Wks. Office.			

These appropriation tickets are prepared in the Works Office (Production Section) in respect to rough and finished component stock, and duly noted on the Production Programme (5-52). Under some conditions the Warehouse might deal first-hand with their own stock, and send the ticket to the Works Office. The tickets are numbered and arranged for carbon duplicate. The loose copy is sent to the General Stores, and a corresponding Goods Issue Voucher is sent to the Work Depot for withdrawing the stock when available. The same ticket and routine may be applied to bulk material and standard fittings when not specially ordered in each case. The column "Present Stage" has reference to whether in finished, rough or as bought stage. Size of form may be 2½″ × 3½″.

5-56.

5-56. STOCK APPROPRIATION CARD.

5-56. STOCK APPROPRIATION CARD. W. B. & CO. LTD. Ordering Level…………	Stage.	Drawing No.	Description.	Design Ref.

To come.		Receipts.		Quan. to be accounted for.	Appropriations.					Balance.	
Office Order.	Quan.	Date.	Quan.		Ticket No.	Date.	Office Order.	Viewing Report.	Cause of Rejection.	Ready.	In Progress.

These cards are made up in the Works Office (Production Section), and control the use of the margins or reserves of components allowed on the various orders (see Quantity Slip, 5-53) whether a Stock Manufacturing Order or not. The product of Stock Manufacturing Orders is also dealt with on these cards. In the case of stock held in the Warehouse, a separate set of stock appropriation cards may be kept up there as well as in the Works Office. The routine allows every freedom in appropriation, and any adjustment found necessary in the cost allocation is easily effected from the respective Goods Issue Voucher. The Ordering Level is a question of how low the unappropriated balance may fall before applying for further sanction to manufacture for stock. The probable demand may vary enough to make a fixed ordering level misleading. Size of form may be 5″ × 8″. Distinctive colours are necessary for finished and rough components.

5-57.

5-57. APPLICATION FOR STOCK MANUFACTURING SANCTION.

W. B. & CO. LTD. Date…………………………No.

Item No.	Design Ref.	Description.	Average Monthly Sales.		Unappropriated Stock.		Last Sanction.			Sanction now Applied for.				Quantity Sanctioned.	Stock M'f'g Order.
			Period.	Quan.	Ready.	In Progress.	Date.	Quan.	Time Taken.	Quan.	Dwg. No.	Stage.	Approx. Total Cost.		
1															
2															
3															

Prepared by………….. Passed……………..Wks. M'g'r. Approved……………..Gen. M'g'r.

These applications are prepared in the Works Office (Production Section), and are based on the figures of the Stock Appropriation Cards and Warehouse Memos. (5-106). This form may be used for applying for Office Orders to cover Experiments or other exceptional work. The size of form may be same as Office Order (5-12).

COMMENTS AND NOTES FROM OTHER SOURCES.

5-58. TOOLS PROVIDED SCHEDULE. 5-58.
W. B. & CO. LTD.

Name of Part....................................	Material.	Design Class.	Drawing No.	Part No.

Line No.	Process and Operation.	Standard Tools.	Jigs and Special Tools.	Existing Tools.		New Tools.			
				Tool No.	Part No.	Tool No.	Tool Order.	Notes.	Date Ready.
1									
2									
3									

Date Issued......................Prepared by......................Passed by....................Works Manager.

These schedules may be elaborated at will as to the detailed description given of each operation. It will be sufficient in a large number of cases to indicate merely the process, *e.g.* milling. The information under "Standard Tools" may only be necessary for tools not obviously standard. The schedule will be issued as a photo print to Works Office (Production Section), Tool Designer, Machine Shop Foreman, and Tool Store Chargehand. Copies will be affixed on the same mount as the detail drawing in question. The Tool Store Chargehand will be advised by a Completed Tool Advice (5-94) of each tool when ready, and this date he will enter on the respective shop prints of the schedule. The Works Office (Production Section) will issue Tool Sub-Orders (5-59) on receipt of the respective Tool Designs, and the order No. will only appear on their prints of the schedule. The Tool No., which is the important reference No., will be allotted in preparing the schedule in the first instance. This preparation will be carried through by the Ratefixer, with such consultation with other parties as seems necessary. The schedules may be subjected to criticism by a Tool Committee at regular intervals, without delaying their issue. Size of form to suit unit size of shop prints of component drawings.

5-59. TOOL SUB-ORDER. 5-59.
W. B. & CO. LTD.
Date..........................Office Order No..................Tool Order No.....................

For use on Part No.	Operation.	Description of Tool.	Quan.	Tool No.

Made out by.. Passed.......................................

These orders will be issued, as to Jigs and Special Tools called for by the Tools Provided Schedule given above, by the Works Office (Production Section) on receipt of the Tool Design, and duly noted on the Production Programme. The Tool No. is assumed to serve as the tool drawing reference. In the case of standard tools, or tools found necessary to supplement any Tools Provided Schedule, the requisite sub-orders may be made out by the Tool Store Chargehand, and passed by the Works Office (Production Section), or by the Works Manager personally, as he may direct. The Office Order No. serves for information generally, and particularly to the Works Accounts Office for summarising of costs. The Tool Order requires to be made out in triplicate (Tool Room, Works Accounts Office, Issuing Office, *i.e.* Works Office or Tool Stores). For orders issued from the Tool Stores, the Works Office will first receive and act on the Works Accounts Office copy, passing same forward. The Works Office will make out the necessary Purchase Requisitions (5-54), and, if need be, make out a combined Assembly List and Quantity Slip (5-48 and 5-53). Size of form may be 5″ × 8″.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-60.

5-60. RATE FIXING ESTIMATE. W. B. & CO. LTD.	Date of Estimate.	Material.	Drawing No.	Design Ref.
Description.			Preparation Allowance. Mins.	Operating Times. Minutes per piece.
Operation	Details.			

Estimated by.. Approved by..

These estimates are prepared by the Ratefixer. A separate sheet is necessary for each operation. Under the heading of "Details" the elements of the operation are set out, such as the different cuts. The Preparation Allowance is intended to apply to each batch of parts, while the Operating Times will apply to each piece (see Discussion). Size of form may be 5″ × 8″.

5-61.

5-61. JOB DATA SHEET. W. B. & CO. LTD.	Type of Product used for.	Design Class.	Drawing No.	Part No. or Design Ref.
Outline Sketch.		Description.		

All times and costs per piece. Times in mins. Costs in pence. * For Hand Work give Man's No.	Operation. Ref. No....... Prep. Allce............ Operg. Time...........	Operation. Ref. No....... Prep. Allce............ Operg. Time...........	Operation. Ref. No....... Prep. Allce............ Operg. Time...........

Sub-Order No.	Date.	Quantity.	Machine No.*	Time Taken.	Time Paid.	Wages Rate.	Wages Cost.	Shop Charges	Machine No.	Time Taken.	Time Paid.	Wages Rate	Wages Cost.	Shop Charges.	Machine No.	Time Taken.	Time Paid.	Wages Rate.	Wages Cost.	Shop Charges.

These sheets constitute a summary of all completed Job Tickets, which are passed for this purpose from the Wages Office to the Ratefixer. It is assumed that the Sub-Order Scheme will obviate there being more than one Job Ticket for each operation on each batch. It will be noted that the quantity covered by the Sub-Order is taken as the quantity for each operation. This is sufficiently true as a guide to the respective performances. The "times taken" per piece are, however, averaged in each case according to the number passed as correct at the respective operations. Provision is made for the application of shop charges according to the machine used and time taken. This may be important when comparing methods. Each operation should be numbered on these sheets, to facilitate cross reference when one operation supersedes another. For work of a small character, it may be better to give the "Number of pieces per hour" in lieu of the "Time taken per piece." Size of form may correspond with the Tools Provided Schedule (5-57).

COMMENTS AND NOTES FROM OTHER SOURCES.

5-62. JOB INVESTIGATION SHEET. 5-62.

W. B. & CO. LTD. Time in minutes per piece.	Average Time Exceeded.	Week Ending.	Dept.

Man's No.	Machine No.	Sub-Order.	Part.	Quan.	Time Taken.	Lowest Record.	Average Time.	Investigator's Report.

These are made out weekly in the course of making up the Job Data Sheets (5-61). No particular space is indicated on the latter for entering the average times, as a pencil entry is assumed below the job entries. The Assistant Works Manager might very well be the investigator in this connection, reporting to his chief in the space provided. Investigation should be conducted in a comprehensive way, so as to bring out the fairness of time limit, efficiency of machine, of shop service, etc. Forms identical with this, with a suitable endorsement, may be used for reported new records in the way of improved performances. This course serves to confirm the correctness of the record thus set up, and to call attention to good workmen. Size of form may be 10″ × 8″, with widely spaced horizontal lines to give room for report.

5-63. COMPONENT COST COMPARISON CARD. 5-63.

W. B. & CO. LTD. All figures are per piece.	Type of Product used for.	Drawing No.	Part No. or Design Ref.

Description.

Material.	Form.	Weight.	Rate.	Cost.	Rate.	Cost.	Rate.	Cost.
Sub-Order No.								
Quantity								
Ref. No.	Operation.		Wages Cost.	Shop Charges.	Wages Cost.	Shop Charges.	Wages Cost.	Shop Charges.
Total Works Cost per piece			....		....		....	

These cost cards are intended to be made up in the Works Office (Ratefixing Section), and are quite apart from the Works Accounts proper. The information as to material will be based on enquiry and verification of weights. By " Form of Material " is meant whether casting, forging, or bulk material. In the latter case, dimensions may be inserted, just as the Purchase Specification Ref. may be added, if this card is to serve as a reference card to the Production Section. The particulars of Wages Cost and Shop Charges are derived from the Job Data Sheets (5-61). The Total Works Cost is made up of the total material cost, wages cost and shop charges. In the case of finished components passed into stock, the Works Accounts Office will prepare a Finished Component Rate Card (5-128). Size of form should correspond with Job Data Sheet (5-61), but be distinctive in colour.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-64. PLANT RECORD CARD. W. B. & CO. LTD.	Class of Plant.	Plant No.

5-64.

Maker.. Description...	Accessories bearing same Plant No. Lifting Tackle Tons.	Maximum Dimensions of Work.	Location.	
			Date.	Dept.

Cardboard Outline Plan to Scale.	Kind of Foundation. Belting, Length and Section. Angle of Belt with ground. H.P. Transmissible.	Speeds and Feeds.	Investigations of Actual Power Consumption.

Reverse Side.

Date New ....Original Value...............

Investigated Values.			Basis of Machine Rate.
Date.	By.	£	Building Service. Power Service. Producing Unit Service. Tool Service. Materal Service, Deptl. „ Administration „ Contingency „

Repairs.			Cost (if over £1).
Plant Order No.	Date.	Particulars.	

This card is intended to give the information requisite for Works Management purposes. The Works Office (Ratefixing Section) can best make up and hold these cards. The cardboard outline plan is for scheming new arrangements of machines. The details provided on the back of the card are of secondary importance to the Works. Investigated Values refer to actual valuation carried out by the Works as distinct from book values arrived at by arbitrary depreciation percentages. The Machine or Producing Unit Rate details indicated require to be considered in connection with the discussion (Section IV. f). The entries as to Repairs will be derived from the copies of Plant Sub-Orders (5-96). To minimise the clerical work, the cost figures are only reported by the Works Accounts Office when in excess of £1, or other suitable limit. Size of form may be 5″ × 8″.

5-65. PLANT EFFICIENCY REPORT. W. B. & CO. LTD.	Date.	Dept.	Plant No.

5-65.

Short Description.

....

Age of Plant in question......................Operator's Wages Rate.....................Principal Work..................

Report.	Signed.	Date.

This form is used for reporting observed defects in construction and proposals for remedying same, for suggesting new tools and fixings or even new machines, and for reporting generally on any plant matter. The reports are sent in the first instance to the Works Manager, who gets supplementary reports or comments from others as seems necessary. They may be volunteered by Foreman, Ratefixer, Tool Designer or other competent observer. Reports are requested when extensive repairs are contemplated. Size of form same as Plant Record Cards (above).

COMMENTS AND NOTES FROM OTHER SOURCES.

5-66. **PART NUMBER PATTERN REGISTER.** *5-66.*

W. B. & CO. LTD.

Part No.	Short Description.	Drawing No.	From Existing Pattern.		Office Order.	Made by.				Timber Ticket No.	Date Finished.	Inspected and Passed by.	Tracing Card made out.	Notes.
			Pattern Mark.	Alterations.		Check No.	Rate.	Time Limit.	Time Taken.					
0														
1														
2														

This register serves for recording patterns made under and bearing Part Nos. in raised figures. As brought out in the discussion, when such patterns are applied to a second Part No., the original Part No. on the pattern is prefixed with X, and becomes then a Pattern Mark. The terminal numbers 0-9 are printed on the sheets, two or three sets often appearing on the one sheet. This facilitates entries in any sequence. Part Nos. having no reference to castings will, of course, never be filled in. A register in closely similar form will serve as a Pattern Mark Register, the consecutive Nos. being taken up by the Pattern Shop Foreman as occasion requires. The alterations to any patterns for successive office Orders are best noted on the Pattern Tracing Card (5-67), whether Pattern Mark is varied or not. Grade Mark refers to marks applied to patterns to indicate the grade of casting called for by the method adopted for pricing the casting. The point is discussed further under Brass Foundry. The reference to Time Limit assumes that the Pattern Shop Foreman is entrusted with the ratefixing requisite for applying the premium system in the dept. A separate set of records in card form may be preferred for job data of this nature. An independent ratefixer will be better in principle. The Timber Ticket Ref. ensures the timber, etc., used being allocated for each pattern. Size of book may be 13″ × 8″—the horizontal lines should be widely spaced.

IN **5-67. PATTERN TRACING CARD.** *5-67.*

W. B. & CO. LTD.

Pattern Mark.

Description ....

Class of Pattern ....Contraction ....

Made for Office Order.	Date.	Dwg No.	To make.	Core boxes.	Extra pieces.	Ctgs. per mldg.	Pieces per Ctg.

Marks Added.	Alterations.

Inside Brass.	Inside. Iron.	Outside Foundries. 1	2	3	4	OUT

Pattern Mark.

Pattern Out and use Ordered.						Returned.	
Date.	Ctg. Inst.	To make.	Date.	Ctg. Inst.	To make	Date.	Location Ref.

This card is printed on each side, and is designed with one corner cut off. The front and reverse printings are shown above side by side. The front side (left hand) bears IN in plain letter on the left-hand corner, while the reverse side bears OUT in right-hand corner. The scheme is for the cards to be reversed and show OUT—hence the cut corner—when the pattern is out. By the use of signals along the top edge of the card, when in the OUT position, it will be obvious which patterns are lying at a given foundry, " Inside " being synonymous with Works or Own Foundry. The Pattern Mark may be a Part No., and it will, except for secondary applications for Part No. pattern, be unnecessary to fill in column " To make." The Location Reference is the storage place of the pattern, and provision is made for noting altered Location Ref. as often as may be necessary. The entries of all the Casting Instructions for which pattern is used, supplementing same with the Office Order No., if need be, is likely to prove a very useful index. Size of form may be 4½″ × 4½″— reverse or " OUT " side being printed in red.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-68.

CROSS INDEX SHEET.

5 68.

W. B. & CO. LTD. Series..................................Range............00-..........................99

	0	1	2	3	4	5	6	7	8	9
00										
10										
20										
30										
40										
50										
60										
70										
80										
90										
	0	1	2	3	4	5	6	7	8	9
Continuations as indicated.										

This form is introduced here in view of the probable necessity for the Pattern Store Attendant to have a handy index to pattern locations under Pattern Mark references, without referring to the Pattern Tracing Cards. Each sheet is ruled to give 100 spaces, and each sheet can be applied to any range of one hundred Pattern Marks (from 00 to 99) by merely marking at the head of the sheet the range in question. The continuation spaces at foot of sheet allow for overflow cases from the proper squares.

This sheet may be found useful in the General Stores as a cross index to Casting Instructions under Pattern Mark References.

Other applications of this sheet are as a cross index to Purchase Orders under Purchase Requisition References and *vice versa*, and for graphically indicating the receipt of the complete range at the General Stores of each series. This latter function can be usefully utilised in various directions as a safeguard against the miscarriage of any numbered series.

Another application of this sheet is for entering up fortnightly consumption of various shop supplies as issued by the Tool Stores. In that case a set of sheets is appropriated to each kind of supply, and each sheet gives a range of one hundred Check Nos. The feature of this application is its simplicity and semi-graphic result. Size of form may be 13″ × 8″—printed one side only, and preferably red ink.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-69. CASTING INSTRUCTION. 5-69.

W. BLANK & CO. LTD.

No.	Date.	Foundry.	Office Order No.

Line No.	Pattern Mark.	To make.	Total Quan.	Metal Mixture.	Weekly Deliveries Required.	First Due Date.	Notes by Pattern Shop.	Pattern sent to Foundry this day.	Pattern in Foundry.		Special Moulding Boxes.	Foundry Notes.
									Office Order.	Ctg. Inst.		
1												
2												
3												

This sheet is arranged to serve as a daily summary of all patterns sent to the Foundry under the respective Office Order Nos. A sheet for miscellaneous orders may be necessary, in which event the Order No. would appear under "Notes by Pattern Shop." Distinction is necessary in making out these sheets as to the foundry concerned. If an Outside Foundry is in question, the sheet will be passed through the Works Office (Production Section) to the General Office (Buying Section), serving all the functions of a Purchase Requisition (5-54), and then sent with the Purchase Order. The sheets are made out by the Pattern Shop Foreman in triplicate, one copy passing to the Pattern Stores temporarily for delivering the patterns, one copy to Foundry concerned, and one copy to Works Office (Production Section), who duly note on Quantity Slip and pass on to General Stores for receiving purposes. The information as to delivery requirements are obtained from the Quantity Slips (5-53), of which the Foundry may, or may not, have a copy—the Casting Instruction being quite sufficient, except that it does not inform the Foundry of work ahead, for which patterns are not ready or not notified as ready. The "Notes by Pattern Shop" may state when specially finished castings are required. The Foundry may mark off deliveries on these sheets or on back of Quantity Slips—the latter course gives a better survey of the position of the order generally. The label affixed to the respective patterns should quote the Casting Instruction No. in conjunction with the Line No., Office Order No., and date of Instruction. The quantities to be made at one time will be settled by the Foundry Foreman, according to his delivery instructions and shop conditions. The provision of suitable foundry flasks or moulding boxes for each item will have to be arranged for by the Foundry Foreman, and should be looked into as each casting instruction comes to hand to obviate delays. Size of form may be 6½″ × 8″, distinctive sets of colours being used for Instructions to Outside Foundries, and possibly also as between Inside Iron and Inside Brass Foundries.

5-70. PATTERN RECALL SLIP. 5-70.

W. B. & CO. LTD.

Date..................................

Pattern Mark.	Recalled off.			Reason of Recall.
	Office Order.	Casting Inst.	Date.	

Signed.

....

P.S. Attendant. Pattern Shop Foreman.

These slips are devised to regularise the return of patterns on the completion of an order and for intermediate purposes, such as alteration for another more urgent order. The slips are made out by the Pattern Stores Attendant, in duplicate, as to patterns unreturned on the closing of an order, and signed by the Foreman. In the case of recall for other reasons the Foreman will make out slip in triplicate, sending one copy to Foundry, one to Pattern Stores, and one to Works Office (Production Section). Size of form may be 2½″ × 3½″.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-71. CASTING DELIVERY SHEET. 5-71.

W. B. & CO. LTD.

	Foundry.	Date.	Ref. C.D...............

Office Order No.	Casting Inst. Ref.	Pattern Mark.	Short Description.	Metal.	Quantity.	Grade Mark.	Total Weight in lbs. Grades.			Metal Charge.		Process Charge.		Goods Issue Voucher.
							Intricate.	Average.	Plain.	Rate.	Amt.	Rate.	Amt.	

These sheets are made out by the party inspecting the castings before these leave the Foundry. They are made in triplicate, the two carbon copies accompanying the castings to the General Stores, who, after confirming the weights, pass one copy on to the Works Accounts Office, where the metal and process charges will be extended. Separate sheets can be used for each Office Order in question or a number of orders may appear on one sheet. Provision is made for analysing the weights of castings under the several grades indicated. This may only be important in respect to the Brass Foundry output. The General Stores will make out a Goods Issue Voucher and send same to the Work Depot in respect to each lot of castings, unless instructed to accumulate same until specified quantities are reached. The Work Depot will, according to their requirements, utilise these vouchers for drawing the castings. The Inspector acting in the matter should sign each sheet. Similarly with castings received from outside foundries, in which case this sheet serves in lieu of the ordinary Goods Received Note (5-82). Separate sheets should be made for castings passing into stock as rough components. Size of form may be 6½″ × 8″, to correspond with Goods Received Note.

5-72. FOUNDRY WASTER TICKET. 5-72.

W. B. & CO. LTD.

Pattern Mark.	Metal.	Casting Inst. No.	Office Order No.
Description.			Weight. lbs.
Nature of Fault.			Moulded by.
Estimated Material Loss (in value) " Process Charge " Wages " Shop Charges			

Date..............................Signed...........................

Waster Tickets are made out in the Foundry by the Foreman, or by the Casting Inspector in respect to each casting found faulty before leaving the Foundry. The tickets are sent to the General Stores and passed thence to the Works Accounts Office. The estimated loss in respect to each waster may very well be computed by the party making out the ticket, as simple rules can be applied. The scrap metal is supposed to remain in the Foundry along with runners and the like. Castings rejected after leaving the Foundry are made the subject of Viewing Reports (5-98), and the scrap metal then passes to the General Stores to be charged out according as it is disposed of. Size of form may be 4″ × 6″.

5-73. FOUNDRY DAILY WORK SHEET. 5-73.

W. B. & CO. LTD. Foundry..Date..

Check No.	Machine No.	Office Order.	Casting Instn.	Pattern	No. Made.	Time Taken	Wages.		Shop Charges.		Deliveries.	Waster Tickets.
							Rate.	Amt.	Rate.	Amt.		

This sheet is made up each day by the Foundry Clerk, up to and including the column headed " time taken." Separate sheets are used for Moulding and Coremaking. In the case of the Brass Foundry, the " No. done " may refer to boxes moulded. Separate sheets are necessary in each case for castings passing into stock as rough components. The Moulding Sheets for the Iron Foundry are passed to the General Stores for marking off the castings delivered and Waster Tickets received, and to see that the whole number moulded are accounted for. The sheets then pass to the Works Accounts Office, who extend the wages and shop charges. Supplementary sheets are made out there for " extra pay " on the respective jobs. Size of form should agree with Form 5-71.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-74.

5-74. FOUNDRY MIXTURE CARD.

W. B. & CO. LTD.

Date........................... No. ....

Name of Mixture. Symbol.

This card supersedes Card No.................. dated......................... and the proportions given below must be strictly adhered to until further notice.

Metal.	Brand	Charge.		
		Cwts.	Qrs.	lbs.
Signed............	Total			

These cards are for the instruction of the cupola or furnacemen. It will be the special care of the Works Chemist to issue new instructions as often as necessary, according as the metal supplies vary in analysis.

In the case of the Iron Foundry, the proportions of each charge being laid down, the iron stock records can be adjusted on the basis of the number of charges made. Size of form may be 4″ × 6″.

5-75.

5-75. FOUNDRY STOCK CONTROL BOOK.

W. B. & CO. LTD.

Date.	Mixture Card No.	No. of Charges.	Brand.				Brand.				Scrap.				
			Used.	Received.		Balance.	Used.	Received.		Balance.	Weight Used.	Estimated Loss.	Outside Receipts.	From Day's Melt.	Approx. Balance.
			Wt.	G.R.	Wt.	Wt.	Wt.	G.R.	Wt.	Wt.					

This book is kept by the Foundry Clerk and made up each day mainly from the Cupola Attendant's report of the number of charges melted of each specified mixture. The book can be applied to limestone, coke, etc. In regard to scrap, "Outside Receipts" will cover scrap castings received through the General Stores from the Shop, as well as scrap metal purchased. Each day's melt will show a difference representing additions to scrap stock and losses. The latter are estimated and the remainder is entered in the book as scrap received from Day's Melt. The balance thus arrived at can only be approximate, and must be subjected to scrutiny by estimate from actual inspection. Size of book to suit range of brands—intermediate short leaves will keep down the dimensions of the book.

5-76.

5-76. FOUNDRY WEEKLY REPORT.

W. B. & CO. LTD.

Foundry................................ Date......................

Day.	No. of Melts.	Total Metal Melted.	Total Castings sent to Stores.	Metals Used.			Supplies Used.	
		Weight.	Weight.	Brand.	Ex. G.R.	Weight.	Kind.	Weight.
Th. F. S. M. Tu. W.								
Total.				Estimated Loss.				

These reports are prepared by the Foundry Clerk, mainly from the Foundry Stock Control Book, and sent to the Works Accounts Office for allocation and survey purposes. Provision is made under "Ex G.R." for noting the particular consignment (G.R. standing for Goods Received Note). It is a most useful check all round for distinction to be clearly made when a fresh consignment is started on. The metals used and supplies used will only be reported in this way in respect to foundry stock which has to be accounted for by the Foundry. As to metals, this will occur in the case of Iron Foundry only, the Brass Foundry having the metal issued to them day by day from the General Stores. The "Estimated Loss" will also be an Iron Foundry matter only, fortnightly stocktaking being effected in the Brass Foundry to give the actual loss. Size of form may be 6½″ × 8″.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-77. **FORGING DELIVERY SHEET.** *5-77.*
W. B. & CO. LTD.

Date. ....
Ref.
F.D. ....

Office Order Nos.	Part No.	Short Description.	No. Forgings.	Total Net Wt.	Metal Used.		Estimated Metal Loss.	Metal Charge.			Process Charge.		Notes.	Goods Issue Voucher.
					Details.	G.R. Ref.		Wt. charged.	Rate.	Amt.	Rate.	Amt.		

This form is parallel to the Casting Delivery Sheet (5-71), and the notes there given apply here to a large extent. The need to specify the kind and size of metal used arises from the variations in cost of same, and when specially purchased for an order, the Goods Received Note (G.R.) Ref. needs to be quoted, obviating the necessity for other details. The Estimated Metal Loss may be derived by applying percentages, varied according to the judgment of the Smithy Foreman, or may be the actual measured losses. Separate sheets are necessary for forgings passed into stock as rough components. Size of form should correspond with Form 5-71, preferably of distinctive colour.

5-78. **SMITHY DAILY WORK SHEET.** *5-78.*
W. B. & CO. LTD.
Date..

Check No.	Machine No.	Office Order No.	Part No.	Short Description.	Day's Output. Forgings Made.	Time Taken.	Wages.		Shop Charges.		Deliveries.
							Rate.	Amt.	Rate.	Amt.	F.D. Ref.

This form corresponds with the Foundry Daily Work Sheet (5-73), and the remarks there given will apply here largely. In making up the sheet, space will be allowed for grouping together all the day's jobs of each smith, and the smith's assistant's time will be booked along with the smith's. The wasters made in the Smithy will not be enough to require the equivalent of Foundry Waster Tickets (5-72), and any waste that does occur can very well be made the subject of a Viewing Report (5-98) and dealt with as if the forging had left the Smithy—being duly entered up accordingly as to time taken and metal used. Separate sheets are necessary for forgings passed into stock as rough components. This may involve extraction of such items, rather than a divided record of each smith's output. Size of form may be 6½″ × 8″.

5-79. **SMITHY STOCK CONTROL SHEET.** *5-79.*
W. B. & CO. LTD.

Sizes.
Metal.

Metal Received.					Total to be accounted for.	Allocation.			Special Returns.			Total accounted for.	Balance.
Date.	G.R.	For Order.	Size.	Weight Received.		Office Order.	F.D. Ref.	Weight.	Date.	Credit Slip.	Weight.		

This sheet is self-explanatory, except as to Special Returns. The routine intended is that all surplus metal, after completing the forgings required, shall revert to Smithy Stock—not therefore being allocated. This holds good only if the surplus metal is still worth its full value. When, however, the surplus is not worth full value, the metal is sent to the General Stores with a Shop Credit Slip (5-87), and then re-issued to the Smithy at a suitable price. Size of form may be 6½″ × 8″

COMMENTS AND NOTES FROM OTHER SOURCES.

5-80.

5-80. DELIVERY REMINDER CARD.

W. BLANK & CO. LTD.,
EFFICIENCY WORKS, MAIN ROAD,
LONDON.

Purchase Order No.	Dated.	For.

Kindly note we rely on delivery being made on or before..

Please do not fail to send by post an ADVICE OF DESPATCH, the same day as goods are sent.

This is arranged as a postcard with illustration on back advertising some line of product.

These postcards are sent out for every purchase order where delivery from stock is not reasonably assured.

5-81.

5-81. PURCHASE ORDER ENDORSEMENT.

Delivery Reminder.	Telephone Enquiries.	Letters Sent.	Tele-grams.
Quantity Received.	Date.	G.R. Ref.	Returns.

This illustrates a rubber stamp endorsement for placing on the Copy of Purchase Order when received at the General Stores. The endorsement will be put on the front of the order, though, if usually put on the reverse side, same can be printed instead. Rubber Stamps of this style are cheaper and handier when mounted on wood moulding.

5-82.

5-82. GOODS RECEIVED NOTE.

5-82. GOODS RECEIVED NOTE. W. B. & CO. LTD. Supplier.	Purchase Requisition No.	Purchase Order No.	Date Goods Received.	Ref. **G.R.**

Entered for Stock Control.	Description of Goods.	Quan. rec'd.	Rejections.	Notes.	Price.	Invoice Cost.

Per.	Carr.	Quan. Certified by	Goods inspected by.	Inv. No.	Ret'ble Packages.	
....	....	....	....	....	....	....

Cost Allocation Ref............. Space for Goods Issue Vouchers to be attached in the case of Materials charged direct.	Credit Claims.

These notes are made out by the Receiving Clerk in carbon duplicate, the duplicate being retained in the General Stores. The loose note is duly signed by the person responsible for the inspection of the goods, the Receiving Clerk having previously signed as to quantity received of the goods as described. A Stores Tally (5-85) is prepared for each consignment, if it is proposed to keep independent track of same. Many items will be merged at once with existing stock, and no attempt can be made to record the disposal of such consignments. The loose note will be passed to the Works Office (Production Section) for noting on the Production Programme (5-52), and then passed to the Works Accounts Office, where it will be used to check the invoice, and be completed as to prices. The Invoice No. referred to on the form is the number appearing against the corresponding entry in the Works Expenditure Book (5-115). Credit Claims (6-14) arising from rejections or other cause are noted also. The Goods Issue Vouchers (5-86) in respect to Purchases charged direct are attached to the respective G.R. Notes in the Works Accounts Office as they come to hand from the General Stores. Size of form may be 6½″ × 8″, printed two deep, in book style, with the carbon duplicate fast.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-83. ACKNOWLEDGMENT OF GOODS RECEIVED. 5-83.

Telegrams
Blankco, London.

W. BLANK & CO. LTD.,
Engineers and Manufacturers,
Efficiency Works, Main Road,
London.

Telephone
000, London.

Ref. G.A.............................Date......................
Kindly quote both when replying.

....

....

....

We beg to acknowledge receipt of the undermentioned.

Package. per Carriage.

....

Description of Goods.

....

....

....

These acknowledgments are made out in respect to goods received that are not purchases. It may be convenient to have these goods received at the Warehouse, as usually referring to Sales Sundries and Repair Orders. The form can be used as a bare acknowledgment, or suitable notes can be added in the blank space provided at foot. By suitable endorsement it might serve as a Credit Note, where the amount of credit due is obvious. By having the form in triplicate (two loose and one fast in book), two copies can be sent forward to the General Office, who may or may not add any comment before posting one copy to the sender of the goods. The Warehouse can advantageously cut off the corner as each case is dealt with, such as by the return of the goods or supply of replacement. Size of form may be 6½″ × 8″.

5-84. RETURNABLE PACKAGE CARD. 5-84.

W. B. & CO. LTD.

Date received.............................G.R. No.........

Supplier...

Package.......................Charge.......................

,, ... ,, ...

Date of Invoice....................Inv. Ref..............

Returned.

Date..........................

Returns Advice Ref..

Cost of Carriage..

Signed.................................

These cards are issued by the Works Accounts Office to the General Stores immediately it is possible to match the Goods Received (G.R.) Note (5-82) with the Supplier's Invoice. No package is to be returned except on the authority of these cards, the cost of carriage being considered against the charge for the package. The Returns Advice Note, or adapted Advice of Despatch (5-113) is made to serve as a debit to the supplier by the values and invoice date being given (see Discussion). The cards are duly returned to the Works Accounts Office for checking purposes, and to notify the appropriation of any package for works or sales purposes. Size of form may be 3″ × 5″.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-85. STORES TALLY.

W. B. & CO. LTD.

Stock Control Ref........ G.R. or Delivery Ticket Ref.......................

Description...

....

Location Ref.....................	Intended for
Ordering Level..................	Office Order No.

Quan. received.	Issues.				Balance.
	Date.	Sub-Order.	Quan.	By.	

5·85. These tallies are made out in respect to each consignment of goods received at the General Stores, which it is desired to keep a separate account of, instead of merging with stock in hand. Its principal application is to goods specially purchased, or process products specially made for a particular Office Order. Provision is, however, made for a cross reference to the Stock Control Records when purely stock purchases are treated on these tallies. The provision for noting the ordering level is useful when the tally serves the function of a stock control record, or alternatively for the Stores Server's guidance in reporting low stocks. The Stores Server will fill in the issues as the Goods Issue Vouchers come to hand. On complete issue the tally is sent to the Works Accounts Office. Size of form, any ordinary tally size, say $2\frac{1}{2}'' \times 5''$.

5-86. GOODS ISSUE VOUCHER.

W. B. & CO. LTD. No. G.V.

Date ready.	G.R. Ref.	For Office Order No.

Quan.	Description

Allocation.	Sub-Order.	Quan.	Rate.	Cost.

Signed..................Dept...............Date.............

5·86. These vouchers are prepared in the General Stores as an advice to the Work Depot or other department first concerned, of each consignment of goods received for a specific Office Order. The goods are duly issued when the voucher is sent back signed by the department receiving the goods. The vouchers will be initiated by the Work Depot for goods from stock, according to Quantity Slips (5-53). Any department may use the vouchers for goods required from stock within limits that do not overlap the functions of the Work Depot. The vouchers pass from the Stores to the Works Accounts Office. Forms may be $3'' \times 5\frac{3}{4}''$ in carbon duplicate.

5-87. SHOP CREDIT SLIP.

W. B. & CO. LTD.

Return of Goods originally supplied for
Sub-Order No...............Office Order No............

Description.	Quan.	Rate.	Credit.

Reason of Return.	Condition of Goods.

Received by.	Date.	Signed.	Dept.

5·87. These credit slips serve firstly to control loans to the shops. They are made out in carbon duplicate by the Stores—except as to quantity—and the detachable copy is sent with the loaned goods. Any material issued for convenience in excess of requirements, *e.g.* bar, is treated as on loan. The carbon copy is retained by the Stores as a reminder, and when the loaned goods or excess material is returned, a corner is cut off the carbon copy to show the item is cleared. For many items, such as scrap and swarf, the credit slips must originate in the dept. sending same to the Stores. The slips will be passed from the Stores to the Works Accounts Office. Size of form as 5-86.

5-88. TIMBER TICKET.

W. B. & CO. LTD. Office Order No....................
Date............ Sub-Order No......................

Purpose.	Kind of Timber.	Length.	Width.	Thickness	Feet Super.	Rate.	Cost.

Used by	Dept.	Signed.

5·88. These tickets are arranged to provide a handy means whereby the allocation of timber to specific orders can be effected. The tickets are made out by the men using the timber and signed by the foreman. Where there is a Timber Store Attendant, and consequent local stock records, the tickets will be passed to him for noting on his stock control cards (see discussion, III d). The tickets must ultimately pass to the Works Accounts Office. Size of form as 5-86.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-89.

5-89. STOCK CONTROL CARD.

W. B. & CO. LTD.

Location.	Unit. of Quan.	Ordering Level	Normal Quan. to be Ordered.	Material.

Advance Appropriation.				Purchase Requisition No.	Purchase Orders.					Receipts.			
Date.	Stock Appropriation Ticket No.	Order No.	Quan.		Date.	Ref.	Supplier.	Quan.	Total to Date.	Date.	G.R. No.	Quan.	Total to Date.

(*Continuation of Headings*)

Description...Class No...

Size or Mark..Item Ref...

Issues.				Transfers.				Balance.	Stock Scrutiny.				
Date.	Allocation Ref.	Quan.	Total to date.	Date.	Sub-Store.	Quan.	Total to date.		Date.	Actual Stock.	Taken by.	Surplus.	Deficit

This card is designed primarily for the control of general stock, as defined in Section IV d, but applies also for component stock, whether in the rough or finished stage. Its application to component stock is intended to be limited to such stock as is held by the General Stores. A separate form (5-110) is provided for dealing with Warehouse Stock, comprising spare parts and complete products.

The issue of component stock is arranged to be subject to authorisation by Stock Appropriation Tickets. When these come to hand without the items being in stock, advance appropriation is noted on the card, and the ticket handed back to the dept. presenting the ticket. A Goods Issue Voucher (5-86) quoting the Stock Appropriation Ticket No. is made out by the General Stores as soon as the necessary items are received into stock, and then sent forward as an advice to the dept. concerned. "Item Ref." refers to the reference adopted to identify the particular size and kind of article in question. It assumes that some classification scheme is adopted. In the case of component stock, the item ref. will be the part No. or standard fittings (S.F.) ref. In the illustration the quantity columns are shown ruled into four by dotted lines, thus serving for weights or liquid measure, whether same are expressed in the usual way or as lbs. and pints respectively. Provision is made for booking transfers from the main stores to sub-stores. These transfers will appear as receipts on the respective sub-stores stock control card. In the matter of stock scrutiny (see discussion, Section IV d), this is carried out by the Works Accounts Office, and the results noted on this card. Under some conditions, the head of the General Stores might carry out a similar check himself, thus supplementing the efforts of the Works Accounts Office. Where "wholesale" stock is held (see Section III d), only the issues to the "retail" branch of the Stores will be entered on these cards, thus obviating voluminous entries of actual issues to orders. The stock control cards dealing with wholesale stock should be clearly marked "Wholesale" with a rubber stamp, or better still, be of distinctive colour. Size of card may be 8½" × 11".

COMMENTS AND NOTES FROM OTHER SOURCES.

5-90.

5-90. DRAWING LOAN SLIP.

W. B. & CO. LTD.

Drawing No...............................

Date..........................Check No...........................

Signed..

This drawing must be returned as soon as finished with, but in any case on Saturday by 12 noon.

These slips are made out by the men desiring to borrow drawings. In the drawing stores section of the Tool Stores, there may be a large blackboard for noting drawings in loan. The loan slips are filed in a card index under the drawing No. and returned to the man when drawing is returned. Anyone else requiring a drawing already loaned may give in a new loan slip in exchange for the existing loan slip, which is then utilised for exchanging with the borrower for the drawing. Size of form may be 2½″ × 3½″, made up thin pads.

5-91.

5-91. TOOL LOAN SLIP.

W. B. & CO. LTD.

Tool No...............................
as per Tools Provided Schedule
for Part No..........................

Description ....

....

....

Date..........................Check No..........................

Signed..

This tool must be returned as soon as finished with. Any damage occurring in use must be reported to the shop foreman.

These slips are used for tools very much the same as Drawing Loan Slips. There is a standard supply of brass tool checks for each man arranged on hooks, and as a tool is loaned, a tool check is put in its place or sufficiently so to indicate who has any given tool. The slips are filed under the man's check No. and given back to the man as the tools are returned. Certain measuring tools may have to be returned at the end of each day. Size of form same as Drawing Loan Slip, but of distinctive colour.

5-92.

5-92. WORKMAN'S TOOL BOOK.

W. B. & CO. LTD. Dept.......................Name....................................Check No............

This book is for entering up all tools and appliances making up each worker's regular or permanent kit. The original issue must be authorised by the shop foreman, but renewals of files and cutting tools will be made by the tool stores chargehand on receipt of worn tool. All tools entered here must be accounted for at any time when requested by tool stores chargehand, and must all be handed in on transfer to another department or on leaving. Tools on temporary loan are to be applied for by tool loan slips and such loans are not to be entered in this book.

Date.	Quan.	Description.	Foreman's Signature.	Served by.	Renewals.								Received back.	
					Date.	By.	Date.	By.	Date.	By.	Date.	By.	Date.	By.

The routine in connection with the use of this book is sufficiently indicated by the notes embodied in the illustration. It may be convenient in some works to print in the names of tools issued to the majority of the workers, such as padlock and key. Men should be encouraged to furnish high-class padlocks of their own, as additional security against improper access, providing a duplicate key is lodged with the Tool Store Chargehand personally. The character of the latter ought to be such as to ensure confidence in his support of their efforts to preserve their own tools equally with the firm's against theft. Size of book may be same as Time Card (5-22) when closed.

5-93.

5-93. SUMMARY OF TOOLS BROKEN AND LOST.

W. B. & CO. LTD. Dept..............................Fortnight ending..............................

Check No.	Plain Tools.		Drills.		Taps.		Reamers.		Mllg. Cutters.		Cutter Bars.		Cutters.		Drifts.		Various.	
	B'kn.	Lost.	B'kn.	Lost.	B'kn.	Lost.	Bk'n.	Lost.	B'kn.	Lost.	B'kn.	Lost.	B'kn.	Lost.	B'kn.	Lost.	Broken.	Lost.
0																		
1																		
2																		

This summary is made up by the Tool Stores Chargehand, as breakages and losses become known. A set of sheets comprising all check Nos. is made up in advance for each fortnight. To facilitate this, the unit figures 0-9 are printed down the sheets. A penalty of half the cost is inflicted in the more flagrant cases and deducted from extra pay earnings. A notice to this effect should be printed on the cover of the Tool Book (5-92). Size of form may be 10 × 8.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-94. COMPLETED TOOL ADVICE. *5-94.*

W. B. & CO. LTD. Ref. C.T. Tool No............

Description of Tool and Operation. ....Quantity....		For Use on Office Order No. Part No. ....
Tool as above sent to Tool Stores For issue to Dept..........................	Inspected by	Date. ....

These advices are made out in triplicate, one copy serving as a delivery ticket to the Tool Stores, and the second copy as an advice to the Machine Shop. The third copy is retained by the foreman toolmaker. Inspection should include testing, and the View Room should, preferably, agree the test with the foreman toolmaker. In mass production this initial testing is of far-reaching importance. The replacement of jigs and special tools calls for the most careful verification. The advice slips in the Tool Stores may be pasted on cards for better filing. Size of form may be same as Form 5-86.

5-95. TOOL STORES RECORD CARD. *5-95.*

W. B. & CO. LTD. Class....................................

Description. Size.

On Order.			Received.				Reserve Stock.			Tools in Service.		Tools Scrapped.			Working Balance.
Date.	Ref.	Quan.	Date.	G.R. Ref.	Tool Advice.	Quan.	In.	Out.	Balance.	Date.	Quan.	Date.	Quan.	By.	

These cards are intended to be entered up by the Tool Stores Chargehand. Provision is made for noting the reserve stock, which is supposed to be under the control of the Tool Stores Chargehand, but suitably separated from the working stock of tools. This course is better than requiring the General Stores to maintain a stock of new tools, emery wheels, and the like. Ordinary utensils and implements (see Section IV d) may have to be held in both stores. Size of form may be 5″ × 8″.

5-96. PLANT SUB-ORDER. *5-96.*

W. B. & CO. LTD. Plant Group......................Date..................................No..................

Special Materials Req'd.		
Purch. Req'n.	Particulars.	Quan.

Plant Ref.	Description.	For Dept.	A/c. Ref.	Addition. Renewal. Alteration. Repair.

Particulars of work to be done by Dept...............	Estimated Cost. Material. Wages.
Sub-Order made out by	Approved. .... Works Manager.

These sub-orders may be made out by the Tool Stores Chargehand as to the everyday repair requirements (see discussion, Section III e), and within specified limits he may issue the orders without waiting for Works Manager's approval. The orders are made out in triplicate, one passing to dept. executing the order and the second copy to the Works Manager for approval and for passing on to the Works Accounts Office. There are two series of orders, " R " for repairs and " N " for new work. Renewals and alterations will be included in the " N " series equally with additions and the final allocation (A/c Ref.) settled later (see discussion, Section IV k) and Plant Sub-Orders Cost Summary, N Series (5-137). Departmental Memorandums (5-106) are used by foremen for notifying their requirements to the Tool Stores. The necessary purchase requisitions may be made out in the Tool Stores under the guidance of the Works Office (Production Section). The more important orders will be initiated by the Works Manager personally. Size of form same as Form 5-59, but of distinctive colour.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-97. STAGE TICKET.

W. B. & CO. LTD.

S.T....................

Part No. or Description.	Quan.	Sub-Order.	Office Order.
Operation.			Date.
			Box No.

Viewing Certificate.

Passed.	Rejects.	V.R. No.	Date.	Signed.

5-97. The purpose of the stage ticket has been discussed in Section III e, and is briefly a delivery and viewing ticket. It serves as a "move" instruction to the shop labourer, and the receiving chargehand holds the ticket as a tracing ticket for work in hand. When the operation is completed as to the sub-order in question, the viewing certificate at the foot of the ticket is filled in by the party responsible for viewing and the ticket sent through the works post to the Wages Office. A new ticket for the next operation is made out by the same party, and accompanies the work accordingly. The Tools Provided Schedule (5-58) may possibly define the sequence of operations. If viewing is only to follow groups of operations, the several operations may be named on Stage Ticket to guide the shops, the operations as done being marked off by the respective chargehands. Size of form to suit Job Ticket (5-26), to which these tickets are ultimately attached.

5-98. VIEWING REPORT.

W. B. & CO. LTD.

(Give clear explanations.) V.R...............

Office Order No.		
Sub-Order No.		
Other Ref.		
Replacement Arranged for.	Date.	Signed.

(*Reverse Side.*)

V.R............

Dept. responsible........... Workman......................	Estimated cost of fault.	
Adjustment of Time as booked by Check No....... ....Hrs............Mins. allowed. Job Advice Slip sent to Wages Office.	Material *less* value of scrap Wages Shop Charges	
	Total	
	Signed....................... Noted Wks. Accts........	

5-98. These reports are made out in respect to the following :

(1) Work rejected in course of production.
(2) Work passed, but not up to the standard limits of size.
(3) Errors in drawings necessitating alteration to work.
(4) Transfers of components from one order to another in course of production.
(5) Inspection of purchased goods when not certified on Goods Received Note (5-82).

The reports are made out by the View Room in triplicate, one copy remaining for reference, one copy passing to the Works Office (Production Office) to arrange for replacement, passing thence to the Ratefixer for estimating cost of fault, who duly advises Wages Office if necessary, and passes report on to Works Accounts Office, the third copy is passed to the Work Depot with the rejected material. The Work Depot make out the necessary Shop Credit Slips (5-87) for disposing of the scrap, after Ratefixer has made up estimate. Probably Works Manager will wish to see all scrap before same is sent from Work Depot. Size of form may be 4″ × 6″.

5-99. INSPECTION CERTIFICATE.

W. B. & CO. LTD.

Date.. ....No.........

Office Order No.		TO WORK DEPOT. The............................ enumerated here have satisfactorily passed the standard Works Inspection and Tests. Signed......................
Pro. No.	Quan.	
Sub-Order No.		
A.U. Ref.	Quan.	Customer's Inspection.

5-99. These certificates are provided to record the inspection of assembly units and erected product, for which Stage Tickets (5-97) will probably not be made out. The inspection may be carried out by the foreman, but preferably by an independent inspector, With certain products, running or other tests may be essential to complete the inspection. A space is provided for noting if customers' inspection has been carried out, or is to follow, or is not required. The certificate is sent to the Work Depot for noting on the programme sheet (5-104), and thence to Works Accounts Office by way of the Works Office (Production Section). Size of form may be 4″ × 6″.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-100. WORK TALLY. *5-100.*

W. B. & CO. LTD.

Part No....................	Sub-Order No................
Name........................	Quantity.......................
....	Due Date........................
Mat'l..........................	Office Order No.............

TALLY COUPON.

S.O..................................

Part No........Quan.....

Due Date...................

Office Order No...........

(Reverse Side.)

Date Tally issued...........

Date Work issued.........

First Operation.............

Rejects.			Replacements.	
V.R.	Date.	Quan.	Date.	Quan.

These tallies constitute the sub-orders for the manufacture of components. They are made out in Work Depot in conjunction with the material available and the Work Depot Programme (5-104). The tally minus coupon is sent to the Shop foreman to notify him the batch of material is ready. The coupon is retained in Work Depot for tracing purposes—the corner being cut off when material has been drawn. The Work Depot issues the requisite material on the return of the Work Tally accompanied by a Stage Ticket (5-97) for the first operation. The tallies accompany the respective batches of work through all operations. The printing shown for reverse side applies to tally and coupon. Viewer enters on back of tally as to rejects and replacements joined up with original sub-order. Entry needs to be made of any transfers to other orders. Tallies for replacements are marked " X," followed by original sub-order ref. The tally coupons for completed sub-orders pass to Works Office (Production Section) for noting on Production Programme (5-52). Size of Tally about 2½″ × 5″.

5-101. ASSEMBLY SUB-ORDER. *5-101.*

W. B. & CO. LTD.

Sub-Order No. A.S.......................

Office Order No..................A.U. Ref................

Description.	Quan.
Special Instructions.	Due Date.

Date issued.

Parts required to complete.

Name.	Part No.	S.F. Ref.	Quan.	Date expected.	Date supplied.

Date completed.........Inspection Certificate No.......

These sub-orders cover assembly units (see discussion, Section III c). They are made out in triplicate by the Work Depot, one copy remaining for reference, the second copy accompanying the sets of components to the foreman concerned, and the third copy passing to the Works Office (Production Section) for noting on Production Programme (5-52), and thence to the Works Accounts Office for labour costing purposes. The completing issues, if sets are incomplete in first instance, may be dealt with by a Departmental Memorandum (5-106) to the Works Office, coupled with marking the items off the sub-order as issued to the shop. The works accounting requirements as to components drawn from stock will be met by a Goods Issue Voucher (5-86) covering the items drawn by the Work Depot from the General Stores in respect to the office order as a whole. Size of form may be 5″ × 8″.

5-102. ERECTING SUB-ORDER. *5-102.*

W. B. & CO. LTD

Sub-Order No. E.S..........

Office Order No.....................Pro. Nos..............

Description.	Quan.
Special Instructions.	Due Date.

Assembly Unit.	A.U. Ref.	Quan.	Notes.	Date issued...........				
				Parts to follow.				
				Name.	Ref.	Quan.	Date expected.	Date supplied.

Date completed.........Inspection Certificate No.......

The notes above as to Assembly Sub-Orders apply to these orders. To complete erection, certain loose components may have to be drawn from stock, or may have been made under the same office order reference. It may happen that the assembly units as drawn for erection will have been charged into stock, in which event Goods Issue Vouchers will be required for accounting purposes accordingly. Where there are differences in finish or accessories between items of complete product made under the same office order No., it is important to issue separate sub-orders for the different progressive Nos. concerned, and such sub-orders must be fully recognised in the cost allocations with regard to material as well as wages. Size of form as 5-101.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-103. ### DAILY LIST OF SUB-ORDERS. *5-103.*

W. B. & CO. LTD.

Issued as Work Tallies to Dept.................................Date.................................

S.O. No.	Office Order No.	Design Ref.	Short Description.	Quan.	Due Date.	Notes.	Completed tallies received.

This list is made up in carbon duplicate as the Work Tallies (5-100) are made out—thus serving as a register of numbers. The description may be restricted to the more notable pieces. At the end of each day, one copy passes to the Works Office (Production Section) for noting on the Production Programme (5-52), being evidence of raw material being available, and it is then passed to the Works Accounts Office, for making out Cost Allocation Cards (5-131). The material is charged to the office order as a whole through the medium of Goods Issue Vouchers (5-86). The provision for notes may be utilised for indicating to the Works Office the tallies that have been marked V.U. (Very Urgent). The list is passed back to Works Office and used for noting that tally coupon comes in when batch is completed, principally for marking off Production Programme. Size of form may be 10″ × 8″.

5-104. ### WORK DEPOT PROGRAMME SHEET. *5-104.*

W. B. & CO. LTD.

Office Order No.................................Assembly Sheet No..........................Assembly Dwg. No..............

A.U..................				Finished Parts Received.		Scrap and Transfers		Work Tallies.										Material Available		Lines No.
Week.								Week												
S.O.																				
Quan.				Ref.	Quan.	Ref.	Quan.		S.O.	Date.	Quan.	S.O.	Date.	Quan.	S.O.	Date	Quan.	Ref.	Quan.	
Extra Slips attached here.								Extra Slips attached here.												1 2 3

For attaching to Assembly List.

These sheets are arranged for placing in the same binder as the Assembly List (5-48) and Quantity Slip (5-53), so that the Work Depot Chargehand may fix the due dates for each sub-order with intelligent regard to ultimate requirements. It is arranged that the entries of quantities shall be in separate columns for each week's programme (as to due dates maturing therein), so as to allow regard to be paid more easily to the shop possibilities, and to facilitate the making out of the Weekly Shortage List (below). The entries of " material available " will be derived from the Goods Issue Vouchers (5-86) received from the General Stores advising receipt of material. Size of form to suit forms 5-48 and 5-53.

5-105. ### WEEKLY SHORTAGE LIST. *5-105.*

W. B. & CO. LTD.

For issue to Dept.....................................Date.................................

Office Order No.	Part No.	Short Description.	Quan.	Work Tally S.O. No.	Notes.	Date received Work Depot.

These lists are based on the assembling requirements, and may be derived from the notes as to shortages appearing on the Assembly and Erecting Sub-Orders (5-101 and 5-102), but it will allow an earlier anticipation to work from the Work Depot Programme Sheet (above). Theoretically no assembly or erecting sub-order should be effective if there are shortages of components. The shortage list is made out in carbon triplicate—one copy passing to the dept. having work in hand, and the second copy to the Works Office (Production Section) for a personal investigation of every item and marking tallies V.U. (Very Urgent). The third copy remains in the Work Depot for reference and marking off receipts. Size of form may be 10″ × 8″.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-106.

5-106. DEPARTMENTAL MEMORANDUM.

W. B. & CO. LTD.

D.M............

To Dept. Date.

Office Order Ref.	Replying to D.M. No.......dated......
Other Ref.	

From Dept........................Signed...... ....

This memorandum form is for use between depts. By having it arranged in triplicate, with the second copy in every case passing, by means of the works post, to the Works Office (Production Section), it will be possible for much help to be afforded from the latter office. The memorandum will serve as a requisition from Warehouse to Works Office (Production Section) for replenishments of warehouse stock (complete product and spare parts) as a requisition on Tool Stores for Tool or Plant Sub-Order, for calling General Stores' or Work Depot's attention to delays, for requesting services of another department, for reporting tool damage, plant stoppage, etc. Size of form same as 5-98.

5-107.

5-107. PROGRESSIVE NO. REGISTER.

W. B. & CO. LTD.

(Sheet Ref..........) Class of Product...

Pro. No.	Production Order No.	Date started.	Erecting Sub-Order.			Sales Ref.	Works Product Note.	
			Date.	Ref.	Special Instructions.		Ref.	Date.

This register is for use when progressive Nos. are given to the complete product. It may be applied to assembly units. The method of taking up numbers may be for one series to be used for all items in each class, or alternatively for each production order to have its own series starting at 1 in each case. The production order need not necessarily be for stock, but might be a Sales Order Ref. used as a production order. The dates of starting and completion (Works Product Note) will be useful for estimating future times of delivery. Size of sheet may be 13″ × 8″.

5-108.

5-108. WORKS PRODUCT NOTE.

W. B. & CO. LTD.

Date..........................W.P.......

To

The undermentioned products are now ready, having satisfactorily passed all requisite inspections and tests.

Description................Quan. ready....................

Catalogue Ref.............Quan. to come................

Part No. A.U. Ref. Pro. No.	Made under Order No.	Special Features.	Inspection Certificate Ref.

Rec'd by.................. Warehouse.

Signed......................... Work Depot Chargehand.

This note is virtually a certificate of all work completed. It is made out in triplicate by the Work Depot, one copy passing to the Warehouse or General Stores, and one to the Works Office (Production Section), and thence to the Works Accounts Office for charging into stock if need be. No product not already in the Warehouse should be despatched without the authority of this note, or accepted into stock, thus ensuring maintenance of the system required for works accounts. Size of form same as 5-98.

5-109.

5-109. FINISHED WEIGHT CARD.

W. B. & CO. LTD.

Date...................

Description.	
....	Part No............
....	A.U. Ref............
Dwg. No........Material..........	Pro. No.............
Manufactured Under Order No.	Weight of one.................lbs.
....	Signed............................ ....

These cards are filled in by the Work Depot under arrangement with the Drawing Office. Cross Index Sheets (5-68) may be used for noting weight cards made out. The cards are passed to the Drawing Office. Size of form may be 2½″ × 3½″.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-110. WAREHOUSE STOCK RECORD.

5-110.

W. B. & CO. LTD.

Code Word............................Design Ref..............................

Description..Catalogue Ref..........................

Requisitions.			Stock Manufacturing or Purchase Order.			Stock Received.				Rotation No.	Advance Appropriation.				Despatches.		
Ref.	Date.	Quan.	Ref.	Date.	Quan.	W.P. No.	G.R. No.	Date.	Quan.		Date.	Office Order No.	Customer.	Delivery promised.	Ref.	Date.	Pro. No.
										0							
										1							
										2							

This stock record is devised to deal with warehouse stock (complete product and spare parts) by taking up a separate line for each item received, hence the consecutive rotation Nos. These rotation Nos. serve equally for items appropriated in advance. A tick against each rotation No. indicates the receipt of the respective items. The references of delivery (W.P. for Works Product Note, and G.R. for Goods Received Note), date and total quantities are given. The marking of the rotation Nos. is in the nature of a graphic record, against which it is easy to set off the items appropriated and the items delivered—the balance representing margin of stock unappropriated. The appropriation may more than absorb all the stock in hand. The rotation Nos. will continue from sheet to sheet under the same design reference. The rotation No. must not be confused with the progressive No. The latter is actually applied to the product as completed (not usually to spare parts), and only when orders are filled in absolute sequence of receipt is the progressive No. likely to agree with the rotation No. in any given case, hence a separate column for the particular " pro. No." of the item used to satisfy the appropriations appearing against the rotation Nos. Purchase orders for warehouse stock are notified to the Warehouse by the General Stores by Departmental Memorandum (5-106). The Warehouse will requisition the Works Office (Production Section) for further stock by means of these memorandums (5-106). Size of stock record sheet may be 8½" × 11".

5-111. WAREHOUSE DAILY REPORT OF DESPATCHES FROM STOCK.

5-111.

W. B. & CO. LTD.

Date..

Design Ref.	Ex.		Pro. No. (if any).	Despatched under Office Order No.	Quantity Analysis under classes of product.					Noted for Works Accounts.
	Stock Mfg. Order.	Purchase G.R. No.								

This report is essentially for accounting purposes, and passes to the Works Accounts Office. It can conveniently be made a medium for analysing the quantities sold of each specified class of product—these being reported to the management in fortnightly totals. The form is in carbon duplicate, one copy remaining in the Warehouse for reference. Size of form according to extent of analysis.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-112.

5-112. **PACKING SLIP.**

P.S...............

Consignee.	Consignee's Ref.	Office Order No.

Quantity.	Description of Goods.	Net Weight.		
		Cwts.	Qrs.	Lbs.

Inspected and checked by... Packed by...

The above goods should be examined before being signed for. If this is not possible, sign for as "UNEXAMINED." In case of damage it is most important to notify us and the carriers immediately. No claim for short weight will be allowed unless an opportunity is afforded us of seeing the goods re-weighed.

These slips are intended for sending with each package, preferably in an envelope label or under the address label. The name of the sender is omitted from the form in case customer's labels are used for addressing packages. The slips are in triplicate, one remaining in Warehouse for reference, one going with package and one passing to General Office for invoicing purposes. In certain cases the slips may be printed with list of items pertaining to standard equipment. The papers for each day may be fastened together and lent to the Works Office for clearing Production Programme (5-52), and to Works Accounts Office for entering on Delivered Orders Cost Abstract (5-138). Size of form may be 6½″ × 8″.

5-113.

5-113. **ADVICE OF DESPATCH.**

Date...........................A.D.

W. BLANK & CO. LTD.
Efficiency Works, Main Road,
LONDON.

To M........................... Consignee's
.... Ref...........................
Per.......................................Carr...........................

Packages.	Value.	....
Mark.		as per Packing Slip P.S.......... enclosed in Package Label. Please advise us and Carriers if goods not delivered promptly. W. B. & CO. LTD.
Measurements.		
Gross Weight. Cwts. Qrs. Lbs. : :		Carrier's Receipt. ....

These advices assume the use of Packing Slips (above) for giving the details, and constitute an advice mainly of the date and method of despatch, with sufficient description only as will allow one copy of the advice to serve as a consignment note for the carrier. There are two more copies, one remaining in the Warehouse, being signed by Carrier as acknowledgment of receipt, and the other going to the General Office for completing the invoice, and when that cannot be done the same day as goods are despatched, possibly as carbon copy of advice the particulars are noted on the General Office copy of Packing Slip, and the advice is posted separately to customer. The advice may be adapted for return of packages to supplier (see discussion, Section IV d). Size of form may be 6½″ × 8″.

5-114.

5-114. **OUTWARDS PACKAGE TRACING CARD.**

W. B. & CO. LTD.

Length.	Breadth.	Depth.	Package No.................
			Kind of Package..........
Timber.	Thickness.	Finish.	To be charged at..........

Date sent.	A.D. No.	Consignee.	Date returned.

This card serves to record the travels of each package used for despatch purposes. The values may be fixed by means of a standard rate per square foot of surface according to the class of packages. These values may appear on Advice of Despatch, whether chargeable or not. Size of card may be 4″ × 6″.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-115. 5-115.

WORKS EXPENDITURE BOOK (First Part).

W. B. & CO. LTD.

Fortnight ending..

Purchases.											Disbursements.	
Inv. No.	Date.	Supplier.	G.R. Ref.	Invoice Total.	Returnable Packages.	Stock Ledger Ref.	General Stock A/c.	Component Stock A/c.	Cost Allocation Ref.	Purchases charged direct.	D.B. Ref. or Cash Report Ref.	Amt.

5-116. 5-116.

WORKS EXPENDITURE BOOK (Second Part).

W. B. & CO. LTD.

Fortnight ending..

Wages.					Works Product.				
Wages Summary Week ending.	Cash Report to Works Ref.	Total.	Time Wages.	Extra Pay and Special Allowances.	Summary Sheet Ref.	Total.	Process Product charged direct.	General Stock A/c.	Component Stock A/c.

5-117. 5-117.

WORKS EXPENDITURE BOOK (Third Part).

W. B. & CO. LTD.

Fortnight ending..

Purchase Credits.										
* Credit Claim Ref.	Returns Note Ref.	Date.	Supplier.	Total.	Returnable Packages.	Stock Ledger Ref.	General Stock A/c.	Component Stock A/c.	Cost Allocation Ref.	Purchases charged direct.

This book is illustrated as being in five parts (remaining two on p. 491), and should be arranged on removable sheets. It will usually be more convenient to have the parts on separate sheets to allow of independent posting, but one sheet may be arranged for two or more parts. The function of the book is discussed in Section IV b, and little needs adding here as to routine. The invoices are entered after being agreed in all particulars, and take up consecutive Nos. The disbursements will involve either an invoice ref. or a Cash Report to Works ref. (Form 5-120), and to pass the disbursement invoice an entry in the Disbursements Book (5-121), duly approved, is necessary. Purchases may occasionally come through a Cash to Works Report, if cash purchases of material are made, the report ref. then appearing in lieu of an invoice No. In the matter of entries *re* Works Product, those on Form 5-116 constitute a grand summary of the details appearing on Forms 5-118 and 5-119. Size of form according to arrangement of parts.

* For illustration of Credit Claim Note refer Form 6-14.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-118. WORKS EXPENDITURE BOOK (Fourth Part). *5-118.*

W. B. & CO. LTD.

Dept................................Process Product Summary Sheet No. PP..................

Fortnight ending.	Delivery Sheet No.	Metal Charges.	Process Charges.	Daily Work Sheet No.	Wages.	Shop Charges.	Total for Period.	Works Expenditure Analysis.		
								Process Product charged direct.	General Stock A/c.	Component Stock A/c.

This part of the Works Expenditure Book is a summary of process product (Iron Foundry, Brass Foundry, Smithy and any other department dealt with in the accounts on the lines discussed in Section IV g). The summary is of sheet totals appearing on Forms 5-71 and 5-73 (Foundry) and Forms 5-77 and 5-78 (Smithy). The totals for the fortnight are posted from this part of the book to the second part (5-116), and are made the subject of a Works Product Abstract (6-44) for the purposes of the financial accounts. The works expenditure analysis is under three heads. The first, process products charged direct, means that the process costs as figured out on the respective delivery and work sheets are allocated direct to the original office order under which the work was carried out. Such office orders may be stock manufacturing orders, the product of which does not pass into stock until finished. In other cases the process products may pass direct into stock as rough castings or forgings. Where such product refers to components, the analysis will be under "Component Stock A/c," whereas such product as plain cast iron or cast bronze bar will pass into the "General Stock A/c." Size of form to suit rest of book.

5-119. WORKS EXPENDITURE BOOK (Fifth Part). *5-119.*

W. B. & CO. LTD.

Stock Product Summary Sheet No. S.P............

Fortnight ending	Delivery Ref.	Stock Mfg. Order.	Short Description of Goods.	Quan.	Works Value.		Posted Stock Ledger.	Wks. Expend. Analysis.	
	Works Product Note. Shop Credit Slip. Goods Acknowledgment.				Rate.	Amount.		General Stock A/c.	Component Stock A/c.

This part of the Works Expenditure Book is largely parallel to the fourth part, but relates to stock product other than process product, and for the most part to product made under stock manufacturing orders. The summary is built up, as to manufactured stock product, from the Works Product Notes (5-108). While the items will probably refer mainly to component stock (whether as loose components, assembly units or complete product), there may be cases of items made for general stock (see Classification, Section IV d), such as utensils and implements. Scrap material recovered from the shops, as swarf and defective material passing into stock as scrap, will be entered up here from the respective Shop Credit Slips (5-87)—the scrap constituting fresh material from the stock accounting point of view (see discussion, Section IV d), and this material is in effect a works product.*

This summary is conveniently used also for entering up goods returned into stock by customers or agents, and by this practice the works expenditure account becomes charged with the new material, and through the financial accounts the costs of sales is reduced according to the works value of the goods returned. This is quite apart from crediting the customer or agent in respect to the return (see discussion, Section IV d). The information as to goods returned into stock will be conveyed by the Acknowledgment of Goods Received (5-83). Size of form as 5-118.

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* A separate sheet for these scrap entries will allow their dissection under "Scrap credited to Orders" and "Scrap not credited to Orders." The sum total constitutes the value charged into stock.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-120. ## CASH REPORT TO WORKS. *5-120.*

W. B. & CO. LTD.

No.................Date...

Date.	Voucher No.	Name.	Particulars.	Chargeable to.	Cash Disbursements.	Wages.	Cash Purchases.	Noted Works A/cs.

This report serves as a summary of all cash payments by the Financial Dept. that have to be accounted for in the works accounts. The reports are furnished weekly to the Works Accounts Office and entered up in the Works Expenditure Book on the one hand, and in the case of cash disbursements and cash purchases are allocated from the reports to the respective cost allocation accounts. Salaries will be entered under "Cash Disbursements," the allocation being given without disclosing names. Disbursements and ledger purchases are not included in these reports, the invoices pertaining to every such item being independently dealt with. Size of form may be 13″ × 8″.

5-121. ## DISBURSEMENTS BOOK. *5-121.*

W. B. & CO. LTD.

Rotation No.	Date.	Name.	Particulars.	Chargeable to.	Amount.	Passed by.	Inv. No.	Noted Works A/cs.
L.D.								

This book serves as a record of disbursements that are not of a petty non-recurring character. The only dividing line perhaps is payments by cheques instead of through petty cash. This record serves the functions of a Goods Received Note (5-82) in passing the invoice covering the prospective disbursement. The entry as to invoice No. indicates that the item has been duly entered in the Works Expenditure Book. Size of sheet may be 13″ × 8″.

5-122. ## SUPPLIERS' PACKAGES RECORD. *5-122.*

W. B. & CO. LTD.

Year...

Only Returnable Packages to be entered.

Supplier...

G.R. No.	Date.	Inv. Date.	Particulars.	Quan.	Rate.	Amount charged.	Returns.				Appropriated for Other Purposes.
							Date.	Advice Ref.	Quan.	Value.	

These records are made up in the Works Accounts Office from the invoices, and this office is responsible for seeing that all packages are accounted for. Returnable Package Cards (5-84) are made out for each lot received, possibly for each package received. The returns are reported by an Advice of Despatch (5-113), suitably endorsed, whereby the suppliers from their copy understand that credit has been taken to the values named for the packages returned. These values are entered accordingly by the Works Accounts Office from their copies into the Works Expenditure Book—third part (5-117)—and also on to these records against the item originally charged. The appropriation of suppliers' packages for other purposes, such as sales, is advised to the Works Accounts Office by means of the Returnable Package Card. If adjustment is deemed necessary in the works accounts, this can be effected by an entry in the Cost Transfer Journal (5-133), deducting from Returnable Packages (this adjustment will be made in the Works Expenditure Book itself), and adding to "Purchases Charged Direct" or "General Stock," whichever may seem more convenient for allocation to the office orders to which the packages are to be finally charged. Size of form may be 8″ × 6½″.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-123. GENERAL STOCK LEDGER. *5-123.*

W. B. & CO. LTD.

Description..

Receipts.						Issues.				
G.R. No.	Date.	Item Ref.	Quan.	Value.	Total to date.	Date.	Item Ref.	Quan.	Value.	Total to date.

Headings continued.

Stock Class No..

Returns.						Stock Ledger Balance.	Stock Control Card Balances.					
Shop Cr. Slip.	Date.	Item Ref.	Quan.	Value.	Total to date.		Date.	Item. Ref.	Quan.	Rate.	Value.	Total.

The routine pertaining to the Stock Ledger is discussed in Section IV d, where the matter of stock scrutiny is also discussed. The balances from the various Stock Control Cards (5-89), corresponding with any one stock class in the stock ledger, are posted here from time to time in the course of the stock scrutiny, and extended at the stock rate by way of comparing the Stock Ledger balances with the Stock Control Card balances, although kept in terms of quantity only. The further stage of stock scrutiny is to verify, by actual weighing or count, that the stock in hand agrees with the stock control card balances. The receipts are entered in the ledger from the respective Goods Received Notes (5-82), while, to save space in the ledger, the issues are summarised on Stock Issue Abstracts (below). The returns are derived from Shop Credit Slips (5-87). Size of ledger sheet (removable type) may be 8″ × 13″.

5-124. GENERAL STOCK RATE CARD. *5-124.*

W. B. & CO. LTD.

Stock Class No..........

....Item Ref................

G.R. No.	Date.	Supplier.	Inv. No.	Quan.	Inv. Rate per	Cost Allocation.	
						Date.	Rate.

These rate cards are provided to supplement the Stock Ledger and to give an independent record for cost allocation purposes. Comparison of purchase prices and sources of supply is facilitated, and the adoption of rates for cost allocation purposes representing an average purchase price is made evident and consequently safer. Changes in rates are similarly recorded and dated. Quantity need only be entered when the attempt is made to price out each consignment at its purchase price without admitting average rates. The cards may be mounted on linen hinges and held in a frame for rapid reference. The size may be 9″ × 4″.

5-125. STOCK ISSUE ABSTRACT. *5-125.*

W. B. & CO. LTD. Period ending...............

Stock Class No............Description.........................

Item Ref.	Quan.	Rate and Total Value.	Item Ref.	Quan.	Rate and Total Value.

These abstracts are for rapidly noting the detail issues, as reported by Goods Issue Vouchers (5-86), or other medium, such as Timber Tickets (5-88). The sheets may possibly be held in alphabetical order of description, where this will facilitate the posting from the vouchers. The quantities for each fortnight are totalled, rated and extended, and the totals under each item ref. posted to the respective class Nos. in the Stock Ledger. Size of form may be 13″ × 8″.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-126.

5-126. COMPONENT STOCK LEDGER.

W. B. & CO. LTD. Description..

SCRAP.				RECEIPTS.						ISSUES.			
V.R. No.	Date.	Quan.	Cause.	Del'y Sheet Product Note.	Date.	Quan.	Rate.	Value.	Total to date.	Date.	Quan.	Value.	Total to date.

Headings continued

Design Ref.....................

RETURNS.					Stock Ledger Balance.	STOCK CONTROL CARD BALANCES.				
Shop Credit Slip.	Date.	Quan.	Value.	Total to date.		Date.	Quan.	Rate.	Value.	Notes.

This ledger differs little from the General Stock Ledger (5-123). There is an additional set of columns for noting the items scrapped in process of manufacture. These entries are apart from the ledger proper, and are for keeping in view the quantity of scrap involved in each case, so that proper consideration shall be given to this aspect in fixing the stock rates to be used. Separate ledgers are necessary for component stock in the General Stores (rough and finished), and in the Warehouse (spare parts and complete products). Standard fittings constitute a division of finished components, and might appear in both ledgers. Assuming a removable sheet ledger, distinctive colour sheets may be used for rough and finished components. It is to be understood that components made under a Stock Manufacturing Order, which do not pass into stock until erected as complete products, will not appear as loose components through this ledger. They will be collected at the Work Depot and passed out for assembling under the same office order No. but under distinct Assembling and Erecting Sub-Orders (5-101 and 5-102). Stock receipts will be notified to the Works Accounts Office by Delivery Sheets (5-71 and 5-77) in the case of rough components (castings and forgings), and by Works Product Notes (5-108) in the case of finished components and complete products. Stock issues will be notified by Goods Issue Vouchers (5-86), and Warehouse Daily Report of Despatches from Stock (5-111). These will be summarised on Stock Issue Abstract (5-125), as in the case of the General Stock Ledger. Size of form as 5-123.

5-127.

5-127. ROUGH COMPONENT RATE CARD.

W. B. & CO. LTD.

Material..Name..Part No............

Office Order.	Process Inst'n.	Quan.	Metal Charge.	Process Charge.	Wages.	Shop Charges.	Total Cost.	Average Cost.	Date.	Average to date.	Scrap %.	Rate adopted.

This rate card is for building up cost of castings and forgings from delivery sheets (5-71 and 5-77) and daily work sheets (5-73 and 5-78). The costing need not be carried out for every batch made. The percentage addition to cover cost of scrap must be derived from experience in each case—the notes entered in the stock ledger (above) serving as a basis. Size of form may be 5 × 8.

5-128.

5-128. FINISHED COMPONENT RATE CARD.

W. B. & CO. LTD.

Material.................................Name.. Design Ref...............

Office Order.	Sub-Order.	Quan.	Material	Disbursements.	Wages.	Shop Charges	Total Cost.	Average Cost.	Date	Average to date.	Tool %.	Scrap %.	Rate adopted

This rate card collates the cost data under the sub-orders as recorded in the cost allocation accounts (5-129, 5-130, and 5-131). The material costs may have to be abstracted from the respective office order costs. The resultant cost figures should be compared with those on the Component Cost Comparison Cards (5-63), as kept in the Works Office (Ratefixing Section). The percentage addition to cover cost of drawings, patterns, jigs and special tools (called on form, Tool %) will depend on quantity over which these preliminary costs are to be spread. For scrap percentage see 5-127. Casehardening to be allowed for when necessary. Size of form as 5-127.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-129. COST ALLOCATION SHEET—STAGE I. 5-129.

W. B. & CO. LTD.

Sheet No.	Section.	Office Order No. ....

Receipt Ref.	Date.	Supplier.	Description.	Sub-Order Ref.	Quan.	Rate.	Purchases charged direct.	Process Products charged direct.	Disbursements.

5-130. COST ALLOCATION SHEET—STAGE II. 5-130.

W. B. & CO. LTD.

Sheet No.	Section.	Office Order No. ....

Issue Ref.	Date.	Description.	Sub-Order Ref.	Quan.	Rate.	General Stock.		Component Stock.		
						Direct Material.	Secondary Material.	Rough.	Finished.	Standard Fittings.

5-131. COST ALLOCATION CARD —STAGE III. 5-131.

W. B. & CO. LTD.

Short Description................................	Quan.	Design Ref.	Office Order No.	Section.	Date.	Dept.	Sub-Order No.
	....	....	....	....	....	....	....

Week No.	Check No.	Process.	Wages.				Shop Charges.	Week No.	Check No.	Extra Pay.		Special Allowances.
			Overtime Charges.	Machine.	Hand.	Secondary.				Machine.	Hand.	

These three forms embody the routine discussed in detail in Section IV e, and reference thereto is necessary. The forms are so arranged that in the stages (I. and II.), dealing with materials, no sub-division of accounts under sub-order Nos. is assumed. Whereas for wages and shop charges (stage III.) the assumption is that there will be a separate card for each sub-order. These cards will be opened from the Daily List of Sub-Orders Issued (5-103), and from the Works Accounts Office copies of Tool, Plant, Assembly and Erecting Sub-Orders (5-59, 5-96, 5-101 and 5-102). There is nothing to prevent these cards being applied to the whole office orders, and in the case of standing orders (see Section IV c), this will be necessary in many cases. Conversely, separate accounts for sub-orders may be kept in regard to material (stages I. and II.), as will be almost imperative in the case of plant sub-orders for new work (N series) to enable the Plant Sub-Orders Cost Summary (5-137) to be prepared. It should be kept in mind that there may be sectional costs under office order references apart from sub-orders, which obviously must fall under one or other sectional account. The sections assumed to be a minimum are Net Production Costs, Costs of Drawings, Patterns, Jigs, and Special Tools, Costs of Errors and Defects, Costs of Final Inspection, Packing and Despatch (see discussion, Section IV e). These sections should be given letter symbols to simplify reference. In regard to stage I., purchases charged direct will be posted from the Goods Received Notes (5-82), after same have been completed from the invoices, and possibly supported by Goods Issue Vouchers (5-86) confirming the allocation. In the case of process products charged direct, the allocation will be derived in part from the Casting and Forging Delivery Sheets (5-71 and 5-77), and in part from the Foundry and Smithy Daily Work Sheets (5-73 and 5-78). Disbursements will be entered from the Cash Reports to Works (5-120) and Disbursements Book (5-121). In regard to stage II., the issue ref. will be Goods Issue Vouchers and the like. The allocation comprised in stage III. will be derived from the Weekly Time Allocation Sheets (5-28) as to wages, hence the sequence of the headings, and from the carbon copy of the Extra Pay Slips (5-29) as to extra pay and through a similar channel as to special allowances. In posting the fortnightly totals from these sheets and cards to the Cost Ledger, a rubber stamp may be usefully applied to bracket the column totals covered under one head in the ledger, and at the same time to stamp the fortnight ending date. Size of form 5-129 and 5-130 may be 10″ × 8″, and form 5-131 5″ × 8″.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-132. **COST LEDGER.**

5-132.

W. B. & CO. LTD.

Short Particulars..

Cost Section.	Fortnight ending.	Sub-Order No.	Cost Allocation.						Cost Transfers.			Total for Period
			Stage.	Ref.	Materials.	Disbursements.	Wages.	Shop Charges.	Ref.	Short Particulars.	Amount.	

Headings continued.

......................................Estimated Total Cost......................Office Order No..........................

Total to Date.	Reported for Financial a/cs	Entered Shop Charges Book.	Deliveries.				Delivered Orders Cost Abstract.	Works Expenditure Book.	Balance.	Notes.
	Works Cost Allocation Abstract.		Ref.	Quan.	Rate.	Works Value.				

The cost ledger is a summary of the cost allocation figures as collected on the Cost Allocation Sheets (5-129, 5-130 and 5-131). The postings are made fortnightly, and the headings in the ledger conform to those in the financial accounts. The ledger is used for effecting transfers of costs, and for marking off the works value of deliveries so as to show the balance or book value of the work in progress, if order not completed. The works values of deliveries are summarised on a Delivered Orders Cost Abstract (5-138), and this will usually be identical with the cost figures. In stock manufacturing orders there may be a balance representing either an over-charge (profit) or under-charge (loss), which is posted to the Shop Charges Book (5-134) (see discussion, Section IV h). The works value of stock product are entered in the Works Expenditure Book, fifth part (5-119). In the case of Standing Orders, the cost ledger totals are mostly posted to the Shop Charges Book. Provision is made on the form for noting the total allocations reported to the Financial Dept. for their accounts, by means of the Works Cost Allocation Abstract (6-43). The costs of sales of warehouse stock may be grouped for each fortnight under the several sales classes, without attempting separate ledger or even allocation accounts for each sales orders. In apportioning the ledger sheets to the several cost sections under each office order ref., the net production costs may be allotted the front side of the sheet and the three other sections (see notes to Form 5-130) may have the reverse side between them. Size of form may be 8″ × 13″.

5-133. **COST TRANSFER JOURNAL.**

5-133.

W. B. & CO. LTD. Sheet No............

Fortnight ending.	Ref.	Particulars.	Cost Allocation Division Totals.	Total Costs.	Credits.		Debits.		Passed by
					Transfer from Office Order Sect.	Posted.	Transfer to Office Order Sect.	Posted.	
			M. D. W. S.C.						
			M. D. W. S.C.						

The question of cost transfers is discussed in Section IV e. They are effected in the Cost Ledger, and, inasmuch as the total allocations that have to be reported for the financial accounts are altered, as to group totals, by the transfers, it is essential to split up the transfers under the heads of material, disbursements, wages and shop charges; hence the provision indicated in the Cost Transfer Journal for entering the figures under these divisions. The entries under "Cost Transfers" in the Cost Ledger must carry the same notes, and then, when the fortnightly totals have been made of the regular allocations, the transfers are detailed under the "Cost Allocation" heads—in red for credits—and a new total made for the purposes of the Works Cost Allocation Abstract (6-43). Size of form may be 13″ × 8″.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-134. *5-134.*

SHOP CHARGES BOOK.

W. B. & CO. LTD.

Sheet No............

Account..A/c. Ref. S.C.............................

DEBITS.					CREDITS.				
Fortnight ending.	Ref.	Particulars.	Items.	Totals.	Fortnight ending.	Ref.	Particulars.	Items.	Totals.

The routine pertaining to this book is discussed in detail in Section IV f, and reference thereto is necessary. The source of the initial entries is the Cost Ledger (5-132) for the most part. Other entries will be derived from the Works Accounts Annual Abstracts (6-45). It is of prime importance that works accounts figures, agreeing in character with financial accounts figures, shall also agree in total, as, for example, depreciation on buildings and plant. Size of form may be 14½″ × 10½″, on removable sheets in a suitable binder.

5-135. *5-135.*

WORKS EXPENSES APPORTIONMENT REPORT (First Part).

W. B. & CO. LTD.

Group or Service..Fortnight ending......................

Standing Order No.	Particulars.	Total Costs as per Shop Charges Book.		Apportionment.					
				Dept.		Dept.		Dept.	
		Ref	Amount.	Basis.	Amount.	Basis.	Amount.	Basis.	Amount.

5-136. *5-136.*

WORKS EXPENSES APPORTIONMENT REPORT (Second Part).

W. B. & CO LTD.

Fortnight ending.................

Per Departmental Wages Allocation Summary (5-30)	Dept.		Dept.	
	Machine.	Hand.	Machine.	Hand.
Production Hours Week No.				
,, ,, ,,				
Proportions, Machine and Hand				
Ratio Depts. to whole Works				
Building Service				
Power ,,				
“ Producing Unit ” ,,				
Tool ,,				
Material ,,				
Departmental ,,				
Administration ,,				
Contingency ,,				
Total Apportionment				
Average Rate per Production Hr.				

The uses of this report, which is arranged here in two parts, are discussed in Section IV f. So far as the first part is concerned, the apportionment to departments, in regard to certain expenses, will have been recorded in the process of cost allocation by virtue of departmental sub-accounts under the standing order references. To a large extent the apportionment must be by formula adjusted as accurately as possible to meet the current conditions. For some expenses, the basis suggested in the discussion on Shop Charges is the ratio of total departmental production hours to total production hours for whole works. These figures are derived from the Departmental Wages Allocation Summaries (5-30) and collated on the second part of the above report. Having arrived at the total apportionment of each class of expenses to each department, the matter is carried a stage further in departments employing both machine and hand producing units, by apportioning the departmental total between the two sections, machine and hand. Size of form must depend on number of departments to be provided for. Where one sheet to carry all depts. would be too wide, intermediate narrow sheets can be arranged so as to approximate to the idea of having the whole apportionment in view at one opening.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-137. PLANT SUB-ORDERS COST SUMMARY (N. Series). *5-137.*

W. B. & CO. LTD.

Plant Group..

Plant Sub-Order.	Particulars.	For Dept.	Sub-Order Cost Allocation.					Costs Brought Forward.	Costs Carried Forward.
			Materials.	Disb'ts.	Wages.	Shop Charges.	Total.		

Headings continued.

Group No..................Sheet No..................Fortnight ending.....................

FINAL ALLOCATION FOR COST LEDGER.

Alterations. A/c. Ref. S2-6.			Repairs. A/c. Ref. R..........			Additions. A/c. Ref. N.......			Shop Charges written back.
Materials.	Disb.	Wages.	Materials.	Disb.	Wages.	Materials.	Disb.	Wages.	

This summary is provided to allow the utmost discrimination to be used in regard to additions to capital values. All new work in connection with buildings and plant is made the subject of a Plant Sub-Order (5-96) in a series designated " N," or other symbol, to distinguish such orders from building and plant repairs which are here marked R. Purchases of plant items should be first authorised by a sub-order. The costs under " N " sub-orders are summarised each fortnight on this form in groups according to the class of plant (see classification, Section IV k). The costs of Uncompleted Sub-Orders may be carried forward without attempting final allocation until completed, except at the end of the financial year, when every item should be cleared. As the standing orders for works repairs (see Section IV c) are arranged to correspond with the groupings of works additions, it is a simple matter to collate in one set of columns all the " N " costs properly chargeable to repairs. This will occur with some renewals and alterations, while some alterations costs are neither additions nor repairs, and require to be charged to a general Alterations Account (Standing Order S2-6). A further function of this summary is to summarise those shop charges that have been applied to " N " orders for the sake of better shop charges accounting and truer costing, but have to be written back again on account of financial accounting requirements. The writing back is effected in the Shop Charges Book (5-134) from this summary. Size of form may be same as 5-132.

5-138. DELIVERED ORDERS COST ABSTRACT. *5-138.*

W. B. & CO. LTD. Year..................Sheet No..........................

Class No...Class No..... ....

Fortnight ending.	Office Order No.	Customer.	Particulars of Order.	Length of time on hand.	Cost Section Totals.				Total Works Cost.	Invoice Price.	% over	% under	Notes.
					Net Production Costs.	Drawings, Patterns, Jigs, and Spec. Tools.	Errors and Defects.	Final Insp. Packing and Despatch.			Works Cost.		

This abstract is made up from the Cost Ledger (5-132) in accordance with orders delivered each fortnight (see 5-112). The orders are classified in accordance with the classes adopted for the Sales Day Book (6-16). The function of the abstract is to present to the General Manager a concise survey of profitable and unprofitable business as the year proceeds. The sectional costs serve to guide future selling prices, as well as form the subject of investigation. The cost figures of completed orders are given in a more detailed summary form on the Estimate Reference Sheet (5-10) without, however, comparing costs against selling price. An extra column is required in the case of Sales Repairs and Sundries Orders for taking out guarantee costs. Costs and profits on sales from warehouse stock may be grouped for each fortnight in one total under the several classes. Size of form may be 5″ × 8″, and may be mounted in a guard book for privacy and safe custody.

WORKS COST ALLOCATION ABSTRACT. See Form 6-43 ⎫ Part VI.
WORKS PRODUCTS ABSTRACT. ,, 6-44 ⎬ Financial Accounts.
WORKS ACCOUNTS ANNUAL ABSTRACT. ,, 6-45 ⎭

COMMENTS AND NOTES FROM OTHER SOURCES.

5-139. STOCK-TAKING SLIP. *5-139.*

W. B. & CO. LTD.

Location.	Lot No.	Item Ref.
Description.		
Material.	G.R. No.	Usefulness.

Date.	Quan.	Cwts.	Qrs.	Lbs.	Certified.
Later Receipts. G.R.					
Later Issues.					
Balance at Stock-taking.					

These slips may be in the form of tallies if preferred. The slips are prepared well in advance of stocktaking as to all particulars other than quantities and weights. These are first entered when lot Nos. are applied (see discussion, Section IV i). All receipts and issues after this preliminary stocktaking has been started are to be entered by the Stores Staff on the slips affected—subject to exception in the case of "retail" stock (see discussion *re* Wholesale Stock, Section IV d). The adjusted balances at the official stocktaking may be passed by inspection in conjunction with test counts in a number of instances. The slips after collection are marked in crayon with the Stock Ledger Reference, and then sorted accordingly for summarising on the Stock Inventory Sheet (below). Size of form may be 6″ × 4″ on thin manilla.

5-140. STOCK INVENTORY SHEET. *5-140.*

W. BLANK & CO. LTD. 31 December, 19...... Division............................Sheet No.............

Stock Ledger Ref.	Location.	Lot No.	Item Ref.	Description.	Material.	G.R. No.	Quan.	Cwts.	Qrs.	lbs.	Rate per	Value.	Group Totals.	Notes.	

These sheets constitute a summary of the particulars given on the Stocktaking Slips (above), and are rated and extended after summarising. Careful check is necessary of each stage in the clerical work. By collating the slips referring to each Stock Ledger Ref., it is feasible to get group totals corresponding in scope with the stock ledger balances. Investigation will be made of all important differences and corrections made in inventory or stock ledger as may be proper. Size of form may be 14½″ × 10½″.

5-141. WORK-IN-PROGRESS SLIP. *5-141.*

W. B. & CO. LTD.
Dept............................Slip No..........

Office Order.	Sub-Order.	Item Ref.	
Description.	Material.		Weight in lbs.
Present Stage.			
Machine Work.	Hand Work.	Quantity.	Certified.

This slip deals with work in progress, including that lying in the Work Depot ready for assembling. The stages at which the work is reported to be, obviously affects the valuation, and undue refinement in that direction will greatly increase the work of valuing. It may be admissible to compromise by describing the stages as either Rough (R), Machined (M), in many cases as half-machined (½M), or even in quarter stages, Fitted (F), and so on. This approximation must be done by a competent person. Size of slip may be 2½″ × 3½″.

5-142. WORK-IN-PROGRESS INVENTORY SHEET. *5-142.*

W. BLANK & CO. LTD. 31 December, 19...... Class of Order..........................Sheet No.......

Office Order No.	Dept.	Sub-Order	Item Ref.	Description.	Kind of Material.	Weight in lbs.	ESTIMATED VALUES.					Cost Ledger Balances.	Inventory Value.
							Materials.	Machine Wages.	Hand Wages.	Shop Charges.	Office Order Totals.		

These sheets are built up from the Work in Progress Slips (above), which are grouped according to office order ref. before being posted. The work of each department requires to be kept separate, more particularly to allow of more accurate averaging of shop charges by applying percentages to the totals of machine and hand wages. This approximation is done to minimise the work of valuation. The Ratefixer should be a suitable person to carry this valuation through. The grand total values under each office order No. are compared with the cost ledger balances (see discussion, Section IV e) and an inventory value adopted, for which the two sets of figures give adequate justification. It is sound practice to effect this valuation for all work in progress, but it should be considered imperative in the case of Stock Manufacturing Orders. Size of form as 5-140.

COMMENTS AND NOTES FROM OTHER SOURCES.

5-143. 5-143.

LOOSE PLANT RATE CARD.

W. B. & CO. LTD.

Rates per........................Class.................................. .....Class No...........

For Dept.	Date.	G.R. Ref.	Completed Tool Advice.	Supplier.	Description.	Purchase Price.	Works Cost.	Replacement Value Rate.	Passed.

These rate cards constitute summaries of loose plant purchases of the respective classes (see classification, Section IV j), and all loose plant made in the works, except as to jigs and special tools charged direct to orders. Provision is made on the cards for noting the replacement value rate as passed for the purposes of the annual valuation (see discussion, Section IV j). Size of form may be 5″ × 8″.

5-144. 5-144.

LOOSE PLANT INVENTORY SHEET.

W. BLANK & CO. LTD.

31 Dec. 19...... Dept........................Group........................Sheet No.........

Class No.	Class.	Particulars.	Notes *re* Condition.	Quan.		Replacement Value.			Stock Value.		
					Cwts qrs. lbs.	Rate.	Per.	Amount.	Rate.	Per.	Amount.

These sheets may be entered up direct by the departmental foremen, and they should be assisted by the scheme of grouping suggested in Section IV j—the groups being entered on separate sheets. The application of the class Nos. can be left to the Works Accounts Office when rating the items. In the case of the Tool Stores, the Chargehand should check his Tool Store Record Cards (5-95), and be able to make up the inventory sheets from them. A certain number of tools will be on permanent loan, and these are entered in Workman's Tool Books (5-92), which will require also to be checked against the tools themselves. Size of form may be 13″ × 8″.

5-145. 5-145.

BUILDINGS AND FIXED PLANT REGISTER.

W. BLANK & CO. LTD.

Replacement Values entered in red. Group..........................Sheet No......

Plant No.	Description.	Original Date.	Original Value.	Depreciation.		Additions.		Book Value.		Discarded Plant Value.	Extra Depreciation.	Location Notes.
				Year.	%	Ref.	Amount.	Date.	Amount.			

This register is arranged for grouping of the plant on the lines of the discussion in Section IV k, and the plant Nos. are assumed to be permanent, whatever the location. Instead of using a card for each item, as in the case of the Plant Record Card (5-64), three or four items are entered on each sheet, giving enough room for the entries likely to occur in the average life of the plant items. Exceptional items can have slips added to provide extra space for entries. It is not considered necessary to work out the depreciation on each machine and resultant book values each year, unless these have been additions altering the value and again when the plant comes under consideration for discarding. Tables are provided in Section IV k for working out depreciation on remainder values for any range of years. The discussion in the same section deals with extra depreciation occasioned by the difference between the discarded plant value and the book value as reached by the operation of the fixed rate of depreciation. Particulars of the capital values of additions to any existing machine are derived from the Plant Sub-Orders Cost Summary (5-137). Size of form may be 14½″ × 10½″ (removeable sheet binder).

The standard sub-divisions of paper as below are obtained by folding the different size sheets as made. A folio is a half sheet, quarto (4to) a quarter sheet, octavo (8vo) an eighth, and so on. A margin must be deducted from the sizes given for trimming.

WRITING PAPERS.

Name of Sheet.	Folio.	4to.	8vo.	16mo.	32mo.
Foolscap -	13¼″ × 8½″	8½″ × 6⅝″	6⅝″ × 4¼″	4¼″ × 3⅜″	3⅜″ × 2⅛″
Post -	15¼″ × 9½″	9½″ × 7⅝″	7⅝″ × 4¾″	4¾″ × 3 13/16″	3 13/16″ × 2⅜″
Demy -	15½″ × 10″	10″ × 7¾″	7¾″ × 5″	5″ × 3⅞″	3⅞″ × 2½″
Large Post	16½″ × 10½″	10½″ × 8¼″	8¼″ × 5¼″	5¼″ × 5⅛″	4⅛″ × 2⅝″
Medium -	17½″ × 11″	11″ × 8¾″	8¾″ × 5½″	5½″ × 4⅜″	4⅜″ × 2¾″
Royal -	19¼″ × 12″	12″ × 9⅜″	9⅜″ × 6″	6″ × 4⅝″	4⅝″ × 3″
Imperial -	22″ × 15″	15″ × 11″	11″ × 7½″	7½″ × 5½″	5½″ × 3¾″

PRINTING PAPERS.

Name of Sheet.	Folio.	4to.	8vo.	16mo.	32mo.
Crown -	15″ × 10″	10″ × 7½″	7½″ × 5″	5″ × 3¾″	3¾″ × 2½″
Demy -	17½″ × 11¼″	11¼″ × 8¾″	8¾″ × 5⅝″	5⅝″ × 4⅜″	4⅜″ × 2 13/16″
Royal -	20″ × 12½″	12½″ × 10″	10″ × 6¼″	6¼″ × 5″	5″ × 3⅛″
Double Crown -	20″ × 15″	15″ × 10″	10″ × 7½″	7½″ × 5″	5″ × 3¾″
Double Demy -	22½″ × 17½″	17½″ × 11¼″	11¼″ × 8¾″	8¾″ × 5⅝″	5⅝″ × 4⅜″
Double Royal -	25″ × 20″	20″ × 12½″	12½″ × 10″	10″ × 6¼″	6¼″ × 5″

In denoting sizes of forms and books, the length of page should be given first, followed by the width.

Standard Card Sizes for card index system are 3″ × 5″, 4″ × 6″, and 5″ × 8″.

SECTION VI

FINANCIAL ACCOUNTS

General System of Financial Accounts.

Section VI a

Books Recommended.

For a system of accounts suitable for an engineering and machine making business carried on by a limited company, the following is a list of books recommended :

Wages and Petty Cash Accounts.
- Wages and Petty Cash Book.
- Wages and Petty Ledger.

Purchases Accounts.
- Bought Cash Book.
- Bought Book (Works Expenditure).
- Do. (General Expenditure).
- Bought Returns Book (Works Expenditure).
- Do. (General Expenditure).
- Bought Ledger.
- Bills Payable Book.
- Bought Ledger Balances Book.

Sales Accounts.
- Sales Cash Book.
- Sales Day Book.
- Sales Returns Book.
- Sales Ledger.
- Bills Receivable Book.
- Sales Ledger Balances Book.

Share Accounts.
- Minute Book.
- Directors' Attendance Book.
- Register of Members and Share Ledger.
- Annual List and Summary (copy of, as filed).
- Annual Statement of Liabilities and Assets.
- Register of Directors and Managers.
- Register of Debenture Holders.
- Register of Mortgages.
- Register of Transfers (Guard Book).
- Transfer Deed Receipt Book.
- Register of Certified Transfers.
- Probate, etc. Register.
- Seal Register.
- Application Allotment and Call Lists.
- Share Certificate Book.
- Dividend and Interest Lists.
- Share and Debenture Holders Address Book.

Private Accounts.
- Private Cash Book.
- Share Cash Book.
- Private Ledger.
- Manufacturing Ledger.
- Private Journal.
- Private Balances Book.

General Description of System.

It will be noted that the list is divided into five sections; the final section being the private accounts, which should be kept by the Accountant of the Company personally, whilst the work covered by the other sections will be subject to his close supervision.

If there is sufficient detail work to warrant the expense incurred, each of the other sections should be placed in the hands of a separate and independent clerk responsible to the Accountant.

General Description of System.

The Private Ledger, Manufacturing Ledger, and Private Cash Book will contain the whole of the accounts of the business in a summarised form, the trade Debtors and Creditors appearing in the Wages and Petty and the Bought and Sales Ledger Adjustment Accounts in the Private Ledger.

The section on Share Accounts is not part of the book-keeping system, but the cash shewn to the credit of the various shareholders accounts in the Register of Members and Share Ledger, must agree with the total Capital of the Company paid up in cash as shewn in the Private Ledger.

Each of the sections, viz.: Wages and Petty Ledger Accounts, Purchase Accounts and Sales Accounts are complete systems in themselves, and capable of being balanced at such intervals as may suit the convenience of the business. To enable this balancing to be carried out, each of the sections will contain in its respective Ledger a Private Ledger Adjustment Account which will agree with the Adjustment Account, for that particular section, appearing in the Private Ledger itself.

The Share Cash Book is included under Private Accounts, as although the details of receipts from Shareholders will be posted to their Accounts in the Register of Members and Share Ledger, it is convenient to have the Capital Accounts in the Private Ledger, and therefore to include this Book in the Private Ledger section.

Interlocking of Financial and Works Accounts.

Satisfactory accounting in any manufacturing business depends upon a correct interlocking of the Financial and Works Accounts. The system advocated in this book has been considered, from experience obtained in engineering, to have carried out this object successfully.

In arranging the system it is most important to provide for a proper division of the items of purchases and expenses and their respective credits passed through the Bought and Bought Returns Books as between Works and General Expenditure. From a perusal of Section IV. on Works Accounts, which provide for the detail records of Works Expenditure, it will be seen that in addition to wages they deal only with materials and expenses appertaining to the cost of manufacture and for the necessary Capital Expenditure.

Following this arrangement, the items in the Bought and Bought Returns Books are sub-divided under the following heads, viz.:

Works Expenditure—Materials.
Do. do. Disbursements.
General Expenditure.

Every item in these books under the first two heads has to be accounted for through the Works Accounts in detail. All the items included in the General Expenditure division are analysed monthly, and the figures resulting from this analysis are posted to the debit of their respective accounts in the Private Ledger.

Interlocking of Financial and Works Accounts.

The wages paid to men and all salaries applicable to the works are dealt with through the Works Accounts.

The totals of the Works Expenditure—Materials division—in the Bought and Bought Returns Books are posted to the debit of a Materials Suspense Account in the Manufacturing Ledger.

The totals of the Works Expenditure—Disbursements division—in the Bought and Bought Returns Books are posted to the debit of a Works Disbursements Suspense Account in the Manufacturing Ledger.

The Works Disbursements Suspense Account will also be debited with such payments made through the Wages and Petty Cash Book as are chargeable to the Works, and this entry will be made through the Journal when the Wages and Petty Adjustment Account in the Private Ledger is being written up, to which account the credit will be passed.

The different accounts appearing in the Manufacturing Ledger, and the Capital Expenditure Accounts in the Private Ledger, are built up by means of Journal entries based on reports received fortnightly from the Works Accounts Office, such Journal entries ultimately exhausting the balances appearing on the Works Materials Suspense Account and the Works Disbursements Suspense Account.

In a similar manner the whole of the wages applicable to the Works are debited to a Works Wages Suspense Account in the Manufacturing Ledger, and transfers made by Journal entries to the different Works Expenditure Accounts, including Capital Expenditure Accounts; the entries being based on fortnightly reports received from the Works Accounts Office and ultimately exhausting the balance appearing on the Works Wages Suspense Account.

Sequence of Treatment.

Having given a short description of the principle upon which the system of accounts is based, it is now proposed to deal separately with each of the sections already foreshadowed,

viz.: Wages and Petty Cash Accounts.
Purchases Accounts.
Sales Accounts.
Share Accounts.
Private Accounts.

shewing the list of books contained in each section, the details of the accounts to appear in the books, and such explanations as may be necessary with regard to the accounts and items to be found therein.

The Financial Accounts will conclude with the following further sections:

Annual Accounts. Audit.

Section **VI b**

Wages and Petty Cash Accounts.

Wages and Petty Cash Account Books.

Books recommended :

Wages and Petty Cash Book.
Wages and Petty Ledger.

Wages and Petty Cash Book.

A suitable ruling for this book, with specimen entries, is given, and the method of posting the various items is clearly explained against the items. The book should be written up promptly as cash is received or payments made. No rough Petty Cash Book should be kept under any circumstances, and every transaction of the Cashier should be written up, even if it is in the nature of a temporary advance on account of Travelling Expenses or Wages. To state the matter plainly, the balance shewn on the Petty Cash Book should always represent the actual cash in hand. Vouchers should be obtained for every payment. The balance should be verified and the vouchers examined at least twice a week by the Accountant.

Wages and Petty Ledger.

The ruling of this book is shewn in the specimen accounts. The following accounts, and such others as may be found necessary in particular cases, should be opened therein.

1. Private Ledger Adjustment Account.
2. Petty Sales.
3. Works Disbursements Suspense Account.
4. Works Wages Suspense Account.
5. General Disbursements.
6. General Salaries.
7. Temporary Advances.
8. Unclaimed Pay.
9. Workmen's Compensation Payments Recoverable.

The accounts numbered 2, 3, 4, 5, and 6 should be transferred monthly to the Private Ledger Adjustment Account and the balance brought down on this account. This balance will represent the Petty Cashier's indebtedness at the particular date to the Accountant for the cash paid to him, and will be made up of the cash in the Petty Cashier's hands and the balances appearing on the other accounts in the Wages and Petty Ledger. The private Ledger Adjustment Account, Works Disbursements Suspense Account and Temporary Advances Account are illustrated in detail form.

The Accountant should journalise the totals of the Petty Cashier's receipt and payments, excluding the cheques paid to him from the Bank, posting the totals of such Journal entries to the Wages and Petty Ledger Adjustment Account in the Private Ledger. The balance on the Wages and Petty Ledger Adjustment Account in the Private Ledger will then agree with the balance shewn on the Private Ledger Adjustment Account in the Wages and Petty Ledger.

WAGES AND PETTY CASH BOOK.

6-1.

Dr. RECEIPTS.

Date.			Petty Sales.	Posting folio.	Total.
1913					
Jan.	1	To Balance - - - - - -			100 0 0
,,		,, Cash - - - - - - -		P.L. Adjustment A/c	100 0 0
,,		,, J. Smith - - - - - - -	0 15 0		
,,		,, H. Jones - - - - - - -	0 10 0		
	6	,, Cash - - - - - - - -		P.L. Adjustment A/c	1000 0 0
,,		,, A. Fitter. Advance repaid - - -		Temporary Advance A/c	10 0 0
,,		,, Iron Trades Employers Insurance Assoc., Compensation recovered *re* B. Furness - - - - - - -		Workmen's Compensation Payments A/c	10 0 0
,,		,, Unclaimed Pay, week ending this date -		Unclaimed Pay A/c	5 10 0
				Petty Sales A/c	1 5 0
				£	1226 15 0

Cr. PAYMENTS.

Date.	Voucher No.	Particulars.	Total.	Special Items.		Works Disbursements.	Works Wages.	General Disbursements.	General Salaries.
				Posting folio.	Amount				
1913									
Jan. 1		By Stamps - - - -	5 0 0					5 0 0	
,,		,, A. Fitter. Advance on a/c Travelling Expenses	10 0 0	Temporary Advances A/c	10 0 0				
,,		,, B. Turner. Accident Compensation:—10th payment of £1 - -	1 0 0	Workmen's Compensation Payment A/c	1 0 0				
3		,, Pickford & Co. carriage on goods from General Castings -	15 0			0 15 0			
4		,, C. Machinist. Unclaimed Pay	2 10 0	Unclaimed Pay A/c	2 10 0				
6		,, Wages, week ending 4th Jan. - - -	1000 0 0				1000 0 0		
,,		,, Salaries - - - -	100 0 0						100 0 0
,,		,, Private Ledger Adjst. A/c, Iron Trades Insurance Assoc. Compensation recovd. per contra	10 0 0	P.L. Adj. A/c	10 0 0				
			1129 5 0	£	23 10 0	0 15 0	1000 0 0	5 0 0	100 0 0
		By Balance carried forward - - - -	97 10 0						
		£	1226 15 0						

Totals of each of these columns to be posted to debit of respective accounts in Wages and Petty Ledger.

WAGES AND PETTY LEDGER.

6-2.

Private Ledger Adjustment A/c.

				Dr.	*Cr.*
1913					
Jan.	1	By Balance - - - - - - - - -			100 0 0
,,	1	,, Cash, Bank - - - - - - - -			100 0 0
,,	6	,, Do. Bank - - - - - - - -			1000 0 0
,,	6	To Do. Iron Trades, - - - - - - -		10 0 0	
,,	31	,, Sundry payments during the month, as summarised in Journal - - - - J.		1105 15 0	
		By Petty Sales - - - - - - - -			1 5 0
		To Balance - - - - - - - -	c/d	85 10 0	
		Made up:—Cash - - - £97 10 0			
		less Iron Trades - £9 0 0		1201 5 0	1201 5 0
		Unclaimed Pay - 3 0 0 12 0 0			
		£85 10 0			
Feb.	1	By Balance - - - - - - - - -	b/d		85 10 0

Works Disbursements Suspense A/c.

				Dr.	*Cr.*
1913					
Jan.	6	To Cash		0 15 0	
,,	31	By P. L Adjustment A/c.			0 15 0

Temporary Advances A/c.

				Dr.	*Cr.*
1913					
Jan.	1	To Cash (A. Fitter)		10 0 0	
,,	6	By Cash ,,			10 0 0

Section VI c

Purchases Accounts.

Purchases Account Books.

BOOKS recommended :

Bought Cash Book.
Bought Book (Works Expenditure).
Do. (General Expenditure).
Bought Returns Book (Works Expenditure).
Do. (General Expenditure).
Bought Ledger.
Bills Payable Book.
Bought Ledger Balances Book.

Bought Cash Book.

This book should be written up and posted as shewn. The total of the payments made and discounts taken will be shewn each week and posted to the credit side of the Private Ledger Adjustment Account in the Bought Ledger. This being completed, the book should be submitted to the Accountant, who will verify the entries made with the list of cheques authorised to be drawn, and make Journal entries crediting cash in the General Cash Book and Discounts in the Private Ledger, and debiting the Bought Ledger Adjustment Account in the Private Ledger.

It will be noticed in the illustration that a column is provided for the voucher number against each payment. In the case of firms adopting the combined cheque and receipt form, the cheque numbers will appear in this column when payments are made by cheque. Where several small payments are made by postal orders, the cash for which is provided by one cheque, a subsidiary numbering scheme must be adopted, which can be continued throughout the whole of the financial year.

The combined cheque and receipt form is now used by a large number of trading firms. It is undoubtedly economical as regards time and trouble so far as the paying firms are concerned, but there are arguments against the use of it from the point of view of the receiving firms. The most important reason against its use is the dislocation of the receiving firm's system of receipts.

BOUGHT CASH BOOK.

6-3.

Date.		Voucher No.	Name.	Posting Reference.	Discount.	Cash.
1913 Jan.	11	(See text.)	Iron Foundry Co. Ltd.	B4/1	12 10 0	487 10 0
,,	12	,,	Jones, J.	B4/2		97 10 0
,,	,,	,,	Henry, W.	B2/2		15 10 0
,,	,,	,,	Williams, K.	B2/2		12 10 0
,,	17	,,	Castings Limited	B2/1		9 15 0
					£12 10 0	£622 15 0

Totals to be posted to Credit of Private Ledger Adjustment A/c in Bought Ledger.

COMBINED CHEQUE AND RECEIPT.

6-4.

W. BLANK & CO. LIMITED,
Engineers and Manufacturers,
EFFICIENCY WORKS, MAIN ROAD, LONDON.

No. of Cheque No..........

19

Date TO THE LONDON CLEARING BANK, LIMITED, LONDON.

Name Pay to or Order

the sum mentioned below if presented within six months from the date hereof duly signed and dated.

Particulars

£

For and on behalf of
W. BLANK & CO. LIMITED.

....
.... } *Directors.*

Amount ....*Secretary.*

£

THIS CHEQUE REQUIRES ENDORSING.

RECEIVED FROM W. BLANK & CO. LIMITED the above-mentioned sum.

Signature
Date

1d. stamp
if £2
or over.

Purchases Account Books.

Bought Book (Works Expenditure).

The detailed items, as shewn in the illustration, should be posted to the credit of the various personal accounts in the Bought Ledger, and the totals to the debit of the Private Ledger Adjustment Account in the same Ledger. On completion of this work the book will be passed over to the Accountant, who will make Journal entries crediting the totals to the Bought Ledger Adjustment Account in the Private Ledger and debiting the respective totals to the Works Materials Suspense Account and Works Disbursements Suspense Account in the Manufacturing Ledger.

Invoices relating to Works Expenditure only will be entered in this book, such invoices being entered after they have been properly checked and passed by the Works Accounts Office. The Works Accounts Office will number each invoice as passed, the number being entered in the book in the column provided for that purpose. This numbering arrangement makes it impossible for any mistake to occur as to the omission of any invoice relating to, or the inclusion of any invoice not relating to, Works Expenditure. The invoices should be filed under the numbers they bear, and the numbers should also appear in the supplier's accounts in the Bought Ledger—thus facilitating reference at any time.

It will be noted that separate columns are provided for items chargeable to Works Materials and Works Disbursements respectively. The divisions of items in this respect will be made by the Works Accounts Office, and that department will put on each invoice a rubber stamp clearly shewing to which class the invoice belongs.

Bought Book (General Expenditure).

The detailed items, as shewn in the illustration, should be posted to the credit of the various personal accounts in the Bought Ledger, and the total to the debit of the Private Ledger Adjustment Account in the Bought Ledger. An analysis will be made of all the entries making up the total. A specimen form of this analysis is shewn on the opposite page. This being done the book should be passed over to the Accountant, who will check the analysis and make a Journal entry, posting the detailed items to the debit of their respective accounts in the Private Ledger and the total to the credit of the Bought Ledger Adjustment Account in the Private Ledger.

Invoices relating to General Expenditure only will be entered in this book. They should bear consecutive numbers distinct from those allotted to the Works Expenditure invoices. The numbers will be entered against the invoices in the Bought Book (General Expenditure) and will also appear in the personal accounts in the Bought Ledger in order to facilitate reference.

BOUGHT BOOK (WORKS EXPENDITURE).

6-5.

Date.		Invoice No.	Name.	Particulars.	Posted.	Total.	Works Material.	Works Disbursements.
1913					B/L			
Jan.	15	W1	Iron Foundry Co. Ltd.	Castings		1000 0 0	1000 0 0	
,,	18	W2	Deal & Co.	Timber		50 0 0	50 0 0	
,,	19	W3	Welsh Colliery	Steam Coal		100 0 0	100 0 0	
,,	,,	W4	Litho Co.	Printing		30 0 0	30 0 0	
,,	20	W5	Fire Insurance Co.	Premium		100 0 0		100 0 0
						£1280 0 0	£1280 0 0	£100 0 0

Post totals to Dr. of Private Ledger Adjustment A/c. in Bought Ledger.

BOUGHT BOOK (GENERAL EXPENDITURE).

6-6.

Date.		Invoice No.	Name.	Particulars.	Posted.	Amount.
1913						
Jan.	2	G1	Jones & Co.	Catalogues		50 0 0
,,	4	G2	London Press	Advertising		5 10 0
,,	7	G3	L.C.C.	Rates		48 5 0
,,	8	G4	Litho Co.	Printing and Books, etc.		12 10 0
						£116 5 0

Post total to Dr. of Private Ledger Adj. A/c in Bought Ledger.

ANALYSIS OF BOUGHT BOOK (GENERAL EXPENDITURE).

Voucher No.	Advertising, Catalogues, etc.	Lighting and Cleaning.	Office Rent, Rates, Taxes, and Insurance.	Patent Fees and Expenses.	Printing and Stationery.	Tendering Expenses.	Sundry Office Expenses.					
G1	50 0 0											
G2	5 10 0											
G3			48 5 0									
G4					12 10 0							

Purchases Account Books.

Bought Returns Book (Works Expenditure).

The detailed items, as shewn in the illustration, should be posted to the debit of the various personal accounts in the Bought Ledger and the totals to the credit of the Private Ledger Adjustment Account in the Bought Ledger. On completion of this work the book will be passed over to the Accountant, who will make Journal entries, debiting the totals to the Bought Ledger Adjustment Account in the Private Ledger and crediting them to the Works Materials Suspense Account and Works Disbursements Suspense Account respectively in the Manufacturing Ledger.

Credit notes relating to Works Expenditure only will be entered in this book, such credit notes having been properly checked and passed by the Works Accounts Office. The numbering system should be carried out exactly in the same manner as in the case of the invoices dealt with through the Bought Book (Works Expenditure). The allocation of the items as between Works Materials and Works Disbursements will be made by the Works Accounts Office, as in the case of the Bought Book (Works Expenditure).

Bought Returns Book (General Expenditure).

The detailed items, as shewn in the illustration, should be posted to the debit of the various personal accounts in the Bought Ledger, and the totals to the credit of the Private Ledger Adjustment Account in the Bought Ledger. An analysis will be made of all the entries making up the total. A specimen form of this analysis is shewn. This being done, the book should be passed over to the Accountant, who will check the analysis and make a Journal entry, posting the detail items to the credit of their respective accounts in the Private Ledger and the total to the debit of the Bought Ledger Adjustment Account in the Private Ledger.

Credit notes relating to General Expenditure only will be entered in this book. They should bear consecutive numbers (distinct from the Works series) which will appear in the Bought Returns Book (General Expenditure) and also in the personal accounts in the Bought Ledger in order to facilitate reference.

BOUGHT RETURNS BOOK (WORKS EXPENDITURE). 6-7.

Date.		Credit No.	Name.	Particulars.	Posting.	Total.	Works Material.	Works Disbursements.
1913 Jan.	16	W1	Iron Foundry Co. Ltd.	Defective Castings		200 0 0	200 0 0	
,,	19	W2	Deal & Co.	Overcharge on Timber		2 10 0	2 10 0	
,,	21	W3	Welsh Colliery	Allce. on Steam Coal		5 0 0	5 0 0	
,,	28	W4	James & Co.	Claim for Shortages in 1911		27 10 0	27 10 0	
						235 0 0	235 0 0	
						Post total to Cr. of Private Ledger Adj. A/c in Bought Ledger.		

BOUGHT RETURNS BOOK (GENERAL EXPENDITURE). 6-8.

Date.		Credit No.	Name.	Particulars.	Posting.	Amount.
1913 Jan.	1	G1	Jones & Co.	Overcharge		2 10 0
,,	9	G2	Litho Co.	Books, etc., returned		1 15 0
						£4 5 0
						Post total to Cr. of Private Ledger Adj. A/c in Bought Ledger.

ANALYSIS OF BOUGHT RETURNS BOOK (GENERAL EXPENDITURE.

Credit No.	Advertising, Catalogues, etc.	Lighting and Cleaning.	Office Rent, Rates, Taxes and Insurance.	Patent Fees and Expenses.	Printing and Stationery.	Tendering Expenses.	Sundry Office Expenses.					
G1	2 10 0											
G2					4 5 0							

Purchases Account Books.

Bought Ledger.

It is not proposed to discuss the respective merits of the ordinary bound, loose, or removable leaf, or card ledgers, for this purpose. There may exist conditions rendering the use of any one of these types advisable, but the writer's experience is entirely in favour of the adoption of removable leaf ledgers under ordinary conditions. Such ledgers require no index, as the leaves can be kept in strict alphabetical order. The covers should be capable of being securely locked—the keys being kept by the Accountant, who should personally witness the insertion of all new leaves and the transfer of the full leaves to the finished leaf covers.

The ruling and method of posting illustrated assumes the adoption of removable leaf ledgers.

A specimen of one of the ordinary personal accounts which will appear in the Ledger is shewn for guidance. Attention is called to the fact that the postings to this account, both of purchases and credits, bear the invoice or credit note number instead of the Bought Book or Bought Returns Book folios commonly used. This arrangement facilitates direct reference to invoices or credit notes which should be filed in numerical order.

The Private Ledger Adjustment Account, as it will appear in the Bought Ledger, is shewn in detail. The method of posting is explained by the notes appearing on the account. It will be seen that two balances, one debit and the other credit, are brought down upon this account. These balances will agree with the totals of all the other respective debit and credit balances extracted from the Bought Ledger at the date the particular balance is struck. The balances will then be submitted to the Accountant, who will verify their correctness by ascertaining whether they agree with the Bought Ledger Adjustment Account appearing in the Private Ledger, which should always be the case.

Should it be necessary to make any adjusting entries, such as writing off old balances or transferring balances from personal accounts in the Bought Ledger to personal accounts in the Sales Ledger or accounts in any other ledger, such entries must be transferred direct from the particular personal Account in the Bought Ledger to the Private Ledger Adjustment Account in the Bought Ledger. No such entries should be made without the special sanction of the Accountant, who will make similar adjusting entries in the Bought Ledger Adjustment Account in the Private Ledger and in the other accounts in the Private or Manufacturing Ledgers affected by such entries.

BOUGHT LEDGER.

6-9.

IRON FOUNDRY CO. LTD., BIRMINGHAM.

2½ % Cash.

Dr.									Cr.
1913 Jan.	18	To Cash	1	487 10 0	1913 Jan.	15	By Goods	W1	1000 0 0
,,	,,	,, Discounts	,,	12 10 0					
,,	16	,, Returns	W1	200 0 0					
,,	20	,, Bills Payable	1	250 0 0					
,,	31	,, Balance	c/a	50 0 0					
				£1000 0 0					£1000 0 0
					1913 Feb.	1	By Balance	b/d	50 0 0

JAMES & CO., LEICESTER.

Nett.

Dr.									Cr.
1913 Jan.	12	To Returns	W4	27 10 0	1913 Jan.	31	By Balance	c/d	27 10 0
1913 Feb.	1	To Balance	b/d	27 10 0					

PRIVATE LEDGER ADJUSTMENT ACCOUNT.

Dr.									Cr.
1913 Jan.	31	To Works Purchases		1180 0 0	1913 Jan.	31	By Cash		622 15 0
		,, Works Disbursements		100 0 0			,, Discounts		12 10 0
							,, Works Returns		235 0 0
		,, General Purchases		116 5 0			,, General ,,		4 5 0
		,, Debtors	c/d	27 10 0			,, Bills Payable		250 0 0
							,, Creditors	c/d	299 5 0
				£1423 15 0					£1423 15 0
		To Creditors	b/d	299 5 0			By Debtors	b/d	27 10 0

Purchases Account Books.

Bills Payable Book.

This book will be written up, as shewn in the illustration, the detail items being posted to the debit of the various personal accounts in the Bought Ledger, and the total to the credit of the Private Ledger Adjustment Account in the Bought Ledger.

These entries being made, the book will be passed over to the Accountant, who will make a Journal entry for the total, crediting it to the Bills Payable Account in the Private Ledger and debiting it to the Bought Ledger Adjustment Account in the Private Ledger.

Bought Ledger Balances Book.

It will be noted in the illustration that provision has been made for taking out the balances at the end of each calendar month. The whole of the balances appearing on the accounts, with the exception of the Private Ledger Adjustment Account, must be taken out in this book. The credit balances should be shewn in black ink, the debit balances in red. Separate totals should be made of the debit and credit balances at the foot of each page. A summary must then be made of the whole, and the totals inserted in the Private Ledger Adjustment Account in the Bought Ledger. These totals should make the account agree as previously mentioned in the paragraph referring to the Bought Ledger.

BILLS PAYABLE BOOK.

6-10.

No.	On whose Account.	To whom Payable.	By whom Drawn.	Date.	Time.	Posting Reference.	Amount.	When Due.	Where Payable.	Date Accepted.	When Paid.
1	Iron Foundry Co.	Their Creditor	Iron Foundry Co.	1913 Jan. 20	3 Mths.	B/L	250 0 0 *Post total to Cr. of Private Ledger Adj. A/c in Bought Ledger.*	Apl. 23	London Clearing Bank	1913 Jan. 21	1913 Apl. 23

BOUGHT LEDGER BALANCES BOOK—*1913.*

6-11.

Name.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Deal & Co.	47 10 0											
Iron Foundry	50 0 0											
James *Dr.*	**27 10 0**											
Jones	18 0 0											
L.C.C.	48 5 0											
Local Gas	25 0 0											
London Press	5 10 0											
Smith & Co.	40 0 0											
Welsh Colliery	65 0 0											
	299 5 0											
Dr.	**27 10 0**											

General Remarks.

To ensure proper supervision of the Purchases Accounts, and as a protection against fraudulent entries, it is recommended that regulations should be strictly enforced that no entry should be made in the Bought Ledger, unless such entry is based upon a document initialled or signed by the Accountant or a responsible person in his department.

The entries passing through the Bought Ledger can be classified as follows :

(*a*) Purchases and Purchases Returns.
(*b*) Cash and Discounts.
(*c*) Bills Payable.
(*d*) Adjustments.

(*a*) *Purchases and Purchases Returns.*

Every invoice and credit note should be initialled by the Accountant's Department with a view to seeing that such invoices and credit notes have been properly passed by the persons responsible and that they are original documents.

(*b*) *Cash and Discounts.*

A list of payments proposed to be made should be submitted by the Bought Ledger Clerk. This list, as shewn on the opposite page, should give the gross amount of the account, the discount taken and the net amount payable. The list should be checked by the Accountant with the personal accounts in the Bought Ledger and with the Creditors Statements. It should be signed as correct, compared with the cheques drawn, and afterwards with the entries in the Bought Cash Book.

(*c*) *Bills Payable.*

Each entry for a Bill Payable should be verified as in the case of payments made by cheque and the entry verified in the Bills Payable Book.

(*d*) *Adjustments.*

Written instructions should be given by the Accountant for each adjusting entry. A convenient form for such instructions is illustrated.

There is often considerable delay in obtaining credit notes from suppliers of goods for short deliveries, overcharges, etc. This delay nearly always means delay in payment of accounts and consequent loss of discounts. To get over this difficulty, it is convenient to use a credit claim form, which is sent promptly to the supplier of the goods and passed to the debit of his account in the Bought Ledger through the medium of the Bought Returns Book. A suitable form for this purpose is given.

LIST OF PAYMENTS. 6-12.

	Name.	Gross Amount.	Discount.	Amount Payable.
	Iron Foundry Co. Ltd.	500 0 0	12 10 0	487 10 0

ACCOUNTANT'S INSTRUCTION. 6-13.

W. BLANK & CO. LIMITED.

INSTRUCTIONS FOR ADJUSTING ENTRY IN.........

Please make the following entry:

Date
Amount
Account to be debited
Account to be credited
Particulars of entry

Accountant.

Date

CREDIT CLAIM NOTE. 6-14.

CREDIT CLAIM NOTE.

W. BLANK & CO. LTD.,
EFFICIENCY WORKS, MAIN ROAD,
LONDON.

Telegrams:
BLANKCO, LONDON.

Telephone:
000, LONDON.

Ref. C..................Date...............................

M...

....

We have to notify you that we have provisionally debited your account with the amount given below for the reasons stated, and shall be glad to have your Credit Note in confirmation per return.

Goods supplied under our Purchase Order No.	Reason						
Date and No. of your Invoice	Particulars.						
Goods in question returned To you on.............................. as per Advice. AD..................							

Viewing Report No.	Cost Allocation Reference.	Credit Note Received.	For and on behalf of W. BLANK & CO. LTD. ....

Section **VI d**

Sales Accounts.

Sales Account Books.

BOOKS recommended :

Sales Cash Book.
Sales Day Book.
Sales Returns Book.
Sales Ledger.
Bills Receivable Book.
Sales Ledger Balances Book.

Sales Cash Book.

This book should be written up and posted as shewn in the illustration. The totals of the cash received and discounts allowed should be shewn each week and posted to the debit side of the Private Ledger Adjustment Account in the Sales Ledger. This being completed, the book will be passed to the Accountant, who will verify the entries from the Bank Paying-in Book and counterfoil receipts and make a Journal entry, debiting cash in the General Cash Book and Discounts in the Private Ledger, and crediting the Sales Ledger Adjustment Account in the Private Ledger.

Receipts under no circumstances should be used for payment of expenses—every receipt without exception should be paid into the Bank.

Sales Day Book.

This book should be written up and posted as shewn in the illustration. Every invoice, whether a press copy invoice book is used, or carbon copies of invoices retained, must bear a suitable reference number. This number should appear in the Sales Day Book and also in the Sales Ledger—the copies of invoices being kept in such form that immediate reference by number is assured.

The detailed items should be posted to the debit of the various personal accounts in the Sales Ledger and the totals to the credit of the Private Ledger Adjustment Account in the Sales Ledger. On completion of this work, the book will be passed over to the Accountant, who will make a Journal entry debiting the totals to the Sales Ledger Adjustment Account in the Private Ledger and crediting the same to the Sales Account also in the Private Ledger.

The Accountant's Department should check the invoices entered in the Sales Day Book with the Press Copy Invoice Book or the carbon copies of invoices, before journalising the totals as before mentioned.

The nature of the business carried on may render it advisable to have several different classes of sales. In that case it is more convenient to use loose sheets for the Sales Day Book instead of a bound book, proper precautions being taken against loss or substitution of sheets.

SALES CASH BOOK.

6-15.

Date.		Order No.	Name.		Posting Reference.	Discounts.			Cash.		
1913 Jan.	5	10	A. Customer	Deposit					100	0	0
,,	10	50	W. Jones			5	0	0	95	0	0
						5	0	0	195	0	0

Post totals to Dr. of Private Ledger Adj. A./c in Sales Ledger.

SALES DAY BOOK.

6-16.

Date.		Invoice Reference.	Name.	Particulars.	Order No.	Ledger Reference.	Amount.		
1913 Jan.	1	1	Jones, W.	1 Cy. Engine	50		205	0	0
,,	24	2	Jones, W.	Parts	55		12	0	0
,,	,,	3	Robinson, J.	Engine Parts	45		50	0	0
,,	27	4	Jackson, F.	4 Cy. Engines	30		300	0	0
							£567	0	0

Post total to Cr. of Private Ledger Adj. A/c in Sales Ledger.

Sales Account Books.

Sales Returns Book.

The detailed items, as shewn in the illustration, should be posted to the credit of the various personal accounts in the Sales Ledger, and the totals to the debit of the Private Ledger Adjustment Account in the Sales Ledger. On completion of this work the book will be passed over to the Accountant, who will make a Journal entry crediting the total to the Sales Ledger Adjustment Account in the Private Ledger and debiting the same to the Sales Account also in the Private Ledger.

The Accountant's Department should check the credit notes entered in the Sales Returns Book with the Press Copy Sales Returns Book or the carbon copies of credit notes before journalising the totals as before mentioned.

Sales Ledger.

The remarks under the heading of Bought Ledger as to the merits of the ordinary bound, removable leaf, or card ledgers, apply with equal force to the Sales Ledger.

A specimen of one of the ordinary personal accounts which will appear in the ledger is shewn for guidance. The postings to this account, both of sales and returns, bear the invoice or credit note number instead of the Sales Day Book or Sales Returns Book folio commonly used. This arrangement facilitates direct reference to the copy of the invoice or credit note.

The private Ledger Adjustment Account, as it will appear in the Sales Ledger, is shewn in detail. The method of posting is explained by the notes appearing on the account. Two balances are brought down on the account, which represent the total of the respective debit and credit balances extracted from the Sales Ledger at the date the particular balance is struck. The balances will be submitted to the Accountant, who will verify their correctness by ascertaining whether they agree with the Sales Ledger Adjustment Account in the Private Ledger.

Should it be necessary to make any adjusting entries, such as writing off Bad Debts or transferring balances from personal accounts in the Sales Ledger to personal accounts in the Bought Ledger or accounts in any other ledger, such entries must be transferred direct from the particular personal account in the Sales Ledger to the Private Ledger Adjustment Account in the Sales Ledger. No such entries should be made without the special sanction of the Accountant, who will make similar adjusting entries in the Sales Ledger Adjustment Account in the Private Ledger and in the other accounts in the Private Ledger affected by such entries.

SALES RETURNS BOOK.

6-17.

Date.		Credit Note Reference.	Name.	Particulars.	Order No.	Ledger Reference.	Amount.
1913 Jan.	2	1	Jones, W.	Parts returned	50		5 0 0
							5 0 0
							Post total to Dr. of Private Ledger Adj. A/c in Sales Ledger.

SALES LEDGER.

6-18.

A. CUSTOMER, NORTH ST., BRIGHTON.

Dr. Net. Half with order, balance on delivery. *Cr.*

					1913 Jan.	5	By Cash	1	100 0 0

W. JONES, WAYSIDE GARAGE.

Dr. 5 % on cash. *Cr.*

			In-voice No.						
1913 Jan.	1	To Goods.	1	205 0 0	1913 Jan.	10	By Cash		95 0 0
,,	24	,, ,,	2	12 0 0	,,	,,	,, Discount		5 0 0
					,,	2	,, Returns		5 0 0
					,,	10	,, Bills receivable		100 0 0
					,,	31	,, Balance c/d		12 0 0
				£217 0 0					£217 0 0
1913 Feb.	1	To Balance	b/d	12 0 0					

PRIVATE LEDGER ADJUSTMENT ACCOUNT.

1913 Jan.	31	To Cash		195 0 0	1913 Jan.	31	By Sales	S.D.B	500 0 0
,,	,,	,, Discount		5 0 0	,,	,,	,, Sales—Repairs and Sundries		67 0 0
,,	,,	,, Returns—Sales,		4 0 0	,,	,,	,, Creditors		100 0 0
,,	,,	,, Returns—Repairs and Sundries		1 0 0					
,,	,,	,, Bills receivable		100 0 0					
,,	,,	,, Debtors	c/d	362 0 0					
				£667 0 0					£667 0 0
1913 Feb.	1	To Creditors	b/d	100 0 0	1913 Feb.	1	By Debtors		362 0 0

Sales Accounts Book.

Bills Receivable Book.

This book must be written up as shewn in the illustration, the detail items being posted to the credit of the various personal accounts in the Sales Ledger and the total to the debit of the Private Ledger Adjustment Account in the Sales Ledger.

These entries completed, the book will be passed to the Accountant, who will make a Journal entry for the total, debiting it to the Bills Receivable Account in the Private Ledger and crediting it to the Sales Ledger Adjustment Account in the Private Ledger.

Sales Ledger Balances Book.

Provision has been made in the illustration for taking out the balances at the end of each calendar month. The whole of the balances appearing on the accounts, with the exception of the Private Ledger Adjustment Account, must be taken out in this book. The debit balances should be shewn in black ink, the credit balances in red. Separate totals should be made of both debit and credit balances at the foot of each page. Two summaries must be made and the totals inserted in the Private Ledger Adjustment Account. These totals should make the account balance.

General Remarks.

Proper supervision of the Sales Accounts is just as important as in the case of the Purchases Accounts, and in order to ensure correct records no entry should be made in the Sales Ledger unless it is based upon a document initialled or signed by the Accountant or a responsible person in his department. The entries passing through the Sales Ledger can be classified as follows :

(*a*) Sales and Sales Returns.
(*b*) Cash and Discounts.
(*c*) Bills Receivable.
(*d*) Adjustments.

(*a*) *Sales and Sales Returns.*

Every invoice or credit note should be initialled by the Accountant's Department, indelible pencil being used, so that the Press copy of the documents shews the initial. If carbon copies of invoices or credit notes are used, the carbon copies themselves must be initialled side by side with the originals.

(*b*) *Cash and Discounts.*

The Bank Paying-in Book should be written up by the Accountant's Department, and Discounts allowed checked and noted at the side of the cash items. The Paying-in Book will be passed to the Sales Cash Book clerk, who will write up his Cash Book from it, this writing up being checked weekly by the Accountant's Department.

BILLS RECEIVABLE BOOK.

6-19.

No.	Date Received.		On whose Account.	Posting Reference.	Amount.	Date of Bill.		Time.	By whom drawn.	On whom drawn.	Where payable.	How disposed of, and Date.			Date due.	
	1913															
1	Jan.	10	Selves	S/L	100 0 0	Jan.	1	3 ms.	Selves	W. Jones	His bank	Matured	Apl.	4	Apl.	4
					Post total to Dr. of Private Ledger Adj. A/c in Sales Ledger.											

SALES LEDGER BALANCES BOOK—*1913.*

6-20.

Name.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
A. Customer *Cr.*	100 0 0											
W. Jones	12 0 0											
J. Robinson	50 0 0											
T. Jackson	300 0 0											
	362 0 0											
Cr.	100 0 0											

(*c*) *Bills Receivable.*

Each entry for a Bill Receivable should be made and verified by the Accountant's Department, as in the case of cash, before the book is passed over to the Sales Ledger Department for posting.

(*d*) *Adjustments.*

Written instructions should be given by the Accountant for each adjusting entry. (See form 6-13 shewn under Bought Accounts.)

Section **VI e**

Share Accounts.

Secretarial and Share Books.

BOOKS recommended :

1. Minute Book.
2. Directors' Attendance Book.
3. Register of Members and Share Ledger.
4. Annual List and Summary (copy of—as filed).
5. Annual Statement of Liabilities and Assets (copy of—as filed).
6. Register of Directors and Managers.
7. Register of Debenture Holders.
8. Register of Mortgages.
9. Register of Transfers (Guard Book).
10. Transfer Deed Receipt Book.
11. Register of Certified Transfers.
12. Probate, etc., Register.
13. Seal Register.
14. Application, Allotment and Call Lists.
15. Share Certificate Book.
16. Dividend and Interest Lists.
17. Share and Debenture Holders Address Book.

The foregoing list is not intended to cover the various forms which will be required in connection with the Share Accounts. Complete lists of such forms can be obtained from some of the law stationery firms making a special practice of supplying the forms. In accordance with the Companies' (Consolidation) Act, 1908, the books numbered 1, 2, 3, 4, 5, 6 and 8 in the foregoing list must be kept by every limited liability company.

1. Minute Book.

In practice two Minute Books will be kept, one dealing with Directors' Meetings and the other with General Meetings. The form of Minute Book for Directors' Meetings only has been illustrated. In writing up a Minute Book it is advisable, for the purpose of future reference, to adhere to a fixed order in writing up Minutes. A convenient order is shewn in the illustration. For reference also it is advisable to keep an alphabetical index under the various subjects dealt with in the Minutes. This index can be kept most conveniently in loose or removable leaf form.

2. Directors' Attendance Book.

The form in common use is illustrated and calls for no special comment.

3. Register of Members and Share Ledger.

A suitable ruling for this book is shewn. It will be noted that it provides for both the Register of Members and Share Ledger in the one book. There is no obligation under the Companies' (Consolidation) Act, 1908, to keep a Share Ledger. If it is desired the two books may be kept separately, but in practice many companies adopt the form given in order to save office work and to facilitate reference.

DIRECTORS' MINUTE BOOK. 6-21.

MINUTES OF MEETING OF DIRECTORS held on *Thursday, 3rd July,* 1913, at EFFICIENCY WORKS, MAIN ROAD, LONDON, at 12 o'clock noon.

Present—
W. BLANK, *Chairman.*
K. B. BLANK.
H. E. CYPHER.
G. W. ZERO.

In Attendance—
THE SECRETARY.

1. *Minutes.*
   The Minutes of the previous Meeting were read and signed.
2. *Finance.*
3. *Transfers.*
4. *Wages and Salaries.*
5. *Sales and Orders on hand.*
6. *Branches and Agencies.*
7. *Capital Expenditure.*
8. *Other Matters.*

DIRECTORS' ATTENDANCE BOOK. 6-21.

Signatures of Directors present at Board Meeting held on the day of

19 at

REGISTER OF MEMBERS AND SHARE LEDGER. 6-23.

NAME
ADDRESS
OCCUPATION OR DESCRIPTION

Dr. *Cr.*

Date.	Particulars of Amount Payable.	No. of Shares.	Folio.	Amount.	Date.	Particulars.	Folio.	Amount.

SHARES ACQUIRED.						SHARES TRANSFERRED.				
Date of Allotment or Registration of Transfer.	Allotment or Transfer No.	No. of Shares Acquired.	Distinctive Numbers.		Certificate No.	Date of Registration of Transfer.	Transfer No.	No. of Shares Transferred.	Distinctive Numbers.	
			From	To					From	To

Inspection of the Register of Members must be allowed without charge to any member, and on payment of a fee not exceeding one shilling to any other person. Any person is entitled to a copy on payment of a sum not exceeding sixpence for each hundred words or part thereof.

4. Annual List and Summary.

5. Annual Statement of Liabilities and Assets.

The whole of the above are combined in the one form, called Statutory Form E, which it is necessary to file annually in the case of all companies. The form is illustrated in the order in which it is usually printed for filing. The instructions printed on the form need not be repeated here.

It should be noted that the Statement in the form of a Balance Sheet containing particulars of the Capital, Liabilities and Assets of the Company is not required to be supplied by a Company which is a "Private Company" within the meaning of Section 121 (1) of the Companies' (Consolidation) Act, 1908. An illustration of the method of filling up this part of the form has been given in full (see second page of form, 6-24). Particular attention is called to the fact that in order to comply with the Act it is not necessary to include a statement of profit and loss.

A copy of the above complete form should be retained in the Company's office.

STATUTORY FORM E (1st Page).

6-24.

Number of Certificate }........................

"THE COMPANIES (CONSOLIDATION) ACT, 1908."

FORM E.
As required by Part II. of the Act (Section 26).

A Companies' Fee Stamp of 5s. must be impressed here.

SUMMARY OF SHARE CAPITAL AND SHARES
OF
W. BLANK & CO.
LIMITED.

made up to the..*day of*..19
(Being the Fourteenth Day after the date of the First Ordinary General Meeting in 19).

Nominal Share Capital, £..................divided into * { .... / .... } Shares of £ * { .... / .... } each.

Total Number of Shares taken up * to the..................day of..................19 { .... / .... }

(Which number must agree with the Total shown in the List as held by existing Members.)

Number of Shares issued subject to payment wholly in Cash - - - ....
Number of Shares issued as fully paid up otherwise than in Cash - - ....
Number of Shares issued as partly paid up to the extent of......................per Share otherwise than in Cash - - - - - - - - - - ....
‡ There has been called up on each of.....................................Shares - £..........................
" " " " .... " - £..........................
" " " " .... " - £..........................
§ Total Amount of Calls received, including Payments on Application and Allotment - - - - - - - - - - - - - - £..........................
Total Amount (if any) agreed to be considered as paid on.......................... Shares which have been issued as fully paid up otherwise than in Cash £..........................
Total Amount (if any) agreed to be considered as paid on..................Shares which have been issued as partly paid up to the extent of.................. per Share - - - - - - - - - - - - - - £..........................
Total Amount of Calls unpaid - - - - - - - - - - - £..........................
Total Amount (if any) of sums paid by way of Commission in respect of Shares or Debentures or allowed by way of Discount since the date of last Summary - - - - - - - - - - - £..........................
Total Amount (if any) paid on ||..........................Shares forfeited - - £..........................
Total Amount of Shares and Stock for which Share Warrants to Bearer are outstanding - - - - - - - - - { Shares £.......................... / Stock £.......................... }
Total Amount of Share Warrants to Bearer issued and surrendered respectively since date of last Summary - { Issued - £.......................... / Surrendered £.......................... }
Number of Shares or Amount of Stock comprised in each Share Warrant to Bearer - - - - - { Number of Shares.......................... / Amount of Stock £.......................... }
Total Amount of Debt due from the Company in respect of all Mortgages and Charges which are required (or, in the case of a Company registered in Scotland, which, if the Company had been registered in England, would be required) to be registered with the Registrar of Companies, or which would require registration if created after the First day of July, 1908 - - - - - - - - - - £..........................

---

* *Where there are Shares of different kinds or amounts (e.g. Preference and Ordinary, or £10 and £5), state the numbers and nominal values separately.*

‡ *Where various amounts have been called, or there are Shares of different kinds, state them separately.*

§ *Include what has been received on forfeited as well as on existing Shares.*

|| *State the Aggregate Number of Shares forfeited (if any).*

☞ The Return must be signed, at the End, by the Manager or Secretary of the Company.

Presented for filing by..

6-24. contd

STATUTORY FORM E (2nd page).

* STATEMENT in the form of a BALANCE SHEET made up to the 31*st* day of *December*, 1913, containing the Particulars of the Capital, Liabilities, and Assets of the Company.

CAPITAL AND LIABILITIES.		ASSETS.	
To Capital issued *95,000 Cumulative Preference Shares of £1 each 95,000* *75,000 Ordinary Shares of £1 each 75,000* *170,000*		*By Cash*	*65,200 0 0*
		By Debtors	*20,000 0 0*
		By Investments at cost or under	*4,000 0 0*
	170,000 0 0	*By Stock of Stores, Timber, Metals, Loose Plant, Tools, etc., and Work in Progress*	*55,000 0 0*
To Five per cent. First Mortgage Debentures	*50,000 0 0*	*By Freehold and Leasehold Land, Buildings, Plant, Machinery, etc., at cost, less Depreciation*	*94,500 0 0*
To Reserve Account	*6,000 0 0*	*By Patterns and Drawings*	*4,500 0 0*
To Creditors	*15,000 0 0*	*By Goodwill*	*20,000 0 0*
To Unclaimed Dividends and Interest	*150 0 0*	*By Preliminary Expenses*	*1,000 0 0*
To Debenture Interest accrued	*1,250 0 0*		
	£242,400 0 0		*£264,200 0 0*

The Balance Sheet from which these figures have been taken has been duly audited by Messrs. , Chartered Accountants, the Auditors of the Company.

* This Statement is not required to be supplied by a Company which is a "Private Company" within the meaning of Section 121 (1) of The Companies (Consolidation) Act, 1908.

STATUTORY FORM E (3rd page).

(*Headings.*)

NAMES AND ADDRESSES OF THE PERSONS WHO ARE THE DIRECTORS

OF

....

....Limited.

on the...........................day of...........................19

NAMES.	ADDRESSES.

STATUTORY FORM E (4th and 5th pages). *(Headings).*

6-24.
ontd.

LIST OF PERSONS HOLDING SHARES IN

……………………………………………………………………………………………Limited,
on the……………………………………day of……………………………, 19 , and of Persons who have held Shares therein at any time since the date of the last Return, or (in the case of the first Return) of the incorporation of the Company, shewing their Names and Addresses, and an Account of the Shares so held.

Folio in Register Ledger containing Particulars.	NAMES, ADDRESSES, AND OCCUPATIONS.			
	SURNAME.	CHRISTIAN NAME.	ADDRESS.	OCCUPATION.

(Headings continued.)

ACCOUNT OF SHARES.					REMARKS.
* Number of Shares held by existing Members at date of Return.†	‡ Particulars of Shares transferred since the date of the last Return or (in the case of the first Return) of the incorporation of the Company by Persons who are still Members.		‡ Particulars of Shares transferred since the date of the last Return or (in the case of the first Return) of the incorporation of the Company by Persons who have ceased to be Members.		
	Number.†	Date of Registration of Transfer.	Number.†	Date of Registration of Transfer.	

(Signature)……………………………………………………

(State whether Manager or Secretary)………………………………

* The Aggregate Number of Shares held, and not the Distinctive Numbers, must be stated, and the column must be added up throughout, so as to make one total to agree with that stated in the Summary to have been taken up.

† When the Shares are of different classes these columns may be subdivided, so that the number of each class held, or transferred, may be shewn separately.

‡ The Date of Registration of each Transfer should be given, as well as the Number of Shares transferred on each date. The particulars should be placed opposite the name of the Transferor, and not opposite that of the Transferee, but the name of the Transferee may be inserted in the "*Remarks*" column, immediately opposite the particulars of each Transfer.

Secretarial and Share Books.

6. Register of Directors and Managers.

A separate Register of Directors and Managers must be kept by the Company. A form is shewn for this purpose. Any change in the Directorate must be at once filed on the usual form with the Registrar of Joint Stock Companies.

7. Register of Debenture Holders.

A form of register is illustrated and calls for no particular comment, except that the columns headed "No. of Debentures Acquired" and "No. of Debentures Transferred" should be split up in the event of the Debentures being issued and transferable in bonds of, say, £20, £50, and £100 each.

8. Register of Mortgages.

A form of register is shewn.

REGISTER OF DIRECTORS AND MANAGERS. 6-25.

Name.	Address.	Occupation.	Appointment or Determination.	Date Thereof.	Filed.	Remarks.
			(Elected) (Deceased) (Resigned)			

REGISTER OF DEBENTURE HOLDERS. 6-26.

NAME
ADDRESS
OCCUPATION OR DESCRIPTION

Dr. *Cr.*

Date.	Particulars of Amount Payable.	Folio.	Amount.	Date.	Particulars.	Folio.	Amount.

DEBENTURES ACQUIRED.

Date of Allotment or Registration of Transfer.	Allotment or Transfer No.	No. of Debentures acquired.	Distinctive Numbers.		Amount. £
			From.	To.	

DEBENTURES TRANSFERRED.

Date of Registration of Transfer.	Transfer No.	No. of Debentures. transferred.	Distinctive Numbers.		Amount. £
			From.	To.	

REGISTER OF MORTGAGES. 6-27.

Date of Instrument creating or evidencing the Mortgage or Charge with description thereof and particulars, *e.g.* Trust Deed, Mortgage, etc., as the case may be.	Amount secured by the Mortgage or charge.	Short particulars of the property Mortgaged or charged.	Names, Addresses and descriptions of the Mortgagees or persons entitled to the charge.	Amount or Rate per cent. of the Commission Allowance or Discount (if any) paid or made either directly or indirectly by the Co. to any person in consideration of his subscribing or agreeing to subscribe whether absolutely or conditionally or procuring or agreeing to procure subscriptions whether absolute or conditional for any of the Debentures included in this Register.	Date of the removal of the charge.

Secretarial and Share Books.

9. Register of Transfers.

A guard book is recommended for this purpose. The pages of the book should be numbered one and upwards, the transfers being pasted in the book and bearing the corresponding numbers. An ordinary form of transfer is shewn. It will be noted that it bears rubber stamps which, for convenience of reference, have been lettered *a*, *b*, *c*, and *d*.

(*a*) *Certification Stamp.*

This stamp is affixed when a transfer is lodged for certification only and not for registration. The certificate for the shares referred to in the transfer is lodged with the transfer and suitably marked and retained. The transfer when certified is returned to the depositor for the purpose of being passed to the transferee or his agent to be subsequently deposited for registration.

(*b*) *Lodgment Stamp.*

This stamp provides for the insertion of the following particulars :

Name of person lodging transfer.
Date lodged.
Transfer Deed Receipt No.
Number of Notification to seller that the transfer has been lodged.

(*c*) *Numbering and Posting Stamp.*

This provides for the following :

No. of Transfer.
Date when passed by the Board.
Transferor's folios in Register of Members.
Transferee's folio in Register of Members.
Number of new Certificate.

(*d*) *Certificate or Certification No. Stamp.*

This provides for shewing the number of the certificate off which the shares are transferred, or when several transfers are made to different transferees from one certificate, the Certification No. appears—the reference being to the Register of Certified Transfers.

With regard to the passing of transfers for registration, it may not be out of place to mention shortly the points which require special attention. They are as follows, viz. :

Check name and address of transferor or seller, number and distinctive numbers of shares, with the certificate and with the account in the Register of Members.
Check correctness of stamp, having regard to consideration money.
Examine transfer as to proper attestation of signatures of the parties thereto.
Compare signature of transferor with his signature appearing on the Application Form or on the transfer conveying the shares to him.
Send transferor a notification of the lodgment of the transfer.

The transfer being found in order in the above respects, it may be put forward for approval of the Board, and when so approved the transferee's name will be entered in the Register of Members and in the Shareholders' Address Book.

6-28.

STOCK OR SHARE TRANSFER.

Stock or Share Transfer.

W. BLANK & CO. LIMITED,
Efficiency Works,
MAIN ROAD, LONDON.
Certificate for............
Shares lodged at Office
..........19...............Registrar.

Certifi-
cation
Stamp
A

in * consideration of the sum of

paid by

hereinafter called the said Transferee ,
Do hereby bargain, sell, assign and transfer to the said Transferee :—

of and in the Undertaking called

TO HOLD unto the said Transferee , Executors, Administrators and Assigns, subject to the several conditions on which held the same immediately before the execution hereof AND the said Transferee , do hereby agree to accept and take the said subject to the conditions aforesaid.

AS WITNESS our hands and seals, this day of in the year of our Lord One thousand nine hundred and

SIGNED, Sealed and Delivered by the above named in the presence of
Witness's Signature .... SEAL
Witness's Address..
Witness's Occupation..

SIGNED, Sealed and Delivered by the above named in the presence of
Witness's Signature .... SEAL
Witness's Address..
Witness's Occupation..

SIGNED, Sealed and Delivered by the above named in the presence of
Witness's Signature .... SEAL
Witness's Address..
Witness's Occupation..

* The Consideration money set forth in a Transfer may differ from that which the first Seller will receive, owing to the sub-sales by the original Buyer. The Stamp Act requires that in such cases the Consideration money paid by the Sub-purchaser shall be the one inserted in the Deed, as regulating the *ad valorem* Duty. The following is the *Clause* in question:

> "Where a person, having contracted for the purchase of any Property, but not having "obtained a Conveyance thereof, contracts to sell the same to any other person, and "the Property is in consequence conveyed immediately to the Sub-purchaser, the Con-"veyance is to be charged with *ad valorem* Duty in respect of the Consideration moving "from the Sub-purchaser." [54 & 55 Vict., cap. 39, sec. 58, sub-sec. 4.]

When a Transfer is executed out of Great Britain it is recommended that the signatures be attested by H.M. Consul or Vice-Consul, a Clergyman, Magistrate, Notary Public, or by some other person holding a public position, as most companies refuse to recognise signatures not so attested.

Lodged by	
Date	
Receipt No.	
Notification No.	

Endorsement Stamp B.

No. of Transfer	
Date when passed	
Fol. of Transferor	
Fol. of Transferee	
No. of Certificate	

Endorsement Stamp C.

Certificate No.

or

Certification No.

Endorsement Stamp D.

Secretarial and Share Books.

10. Transfer Deed Receipt Book.

A suitable form of Transfer Deed Receipt is shewn. The receipt is issued in exchange for the transfer when lodged for registration and must be given up in exchange for the new certificate.

11. Register of Certified Transfers.

The form of register is shewn. On the right hand side are entered the certificates lodged in those cases where a number of transfers are made from one certificate, and on the left side appear the various transferees' names and the balance, if any, making up the total of the original certificate lodged.

TRANSFER DEED RECEIPT BOOK.

6-29.

TRANSFER RECEIPT.

No.....................

NAME....................

PREF.................

ORD.....................

DEBS....................

LEFT BY...............

DATE....................

FEE ....

W. BLANK & CO. LIMITED,
EFFICIENCY WORKS, MAIN ROAD,

No............ LONDON..19

....has left at the Office for registration what purport to be transfers and Certificates as follows:—

Name of Transferee.	No. of Shares.		Distinctive Numbers.		Amount of Debentures.			Certificates Deposited.
	Pref.	Ord.	From.	To.	£20	£50	£100	

Registration fee paid........................

Will be ready after For W. BLANK & CO. LIMITED,

..................................*Secretary.*

REGISTER OF CERTIFIED TRANSFERS.

6-30.

(Left hand ruling.)

Certification No.	Name.	Number of Shares.		Distinctive Numbers.		Transfer No.	Number of New Certificate.
		Preference.	Ordinary.	From.	To.		

CERTIFICATES LODGED.

(Right hand ruling.)

Certification No.	No. of Certificate Split.	Name.	Number of Shares.		Distinctive Numbers.		Date.	Remarks.
			Preference.	Ordinary.	From.	To.		

Secretarial and Share Books.

12. Probate, etc., Register.

A convenient form for this register is shewn. It is intended to be used for the registration of Probates, Powers of Attorney, Orders of Court, Marriages, etc.

13. Seal Register.

A form of register is shewn on the opposite page for keeping the record of all documents to which the Company's Seal is affixed.

14. Application, Allotment and Call Lists.

Convenient forms for listing the applications for shares and the allotments in respect of the same are shewn. A form of call list is also given.

PROBATE REGISTER. *6-31.*

Name.	Address.	Date of Death or Deed, etc.	Executors or Attorneys, etc.		Particulars of Document.	Date of Grant.	Date Registered.	Folio.	By Whom Lodged.
			Name.	Address.					

SEAL REGISTER. *6-32.*

Date.	Description of Document Sealed.	Directors' Signatures.	Witness.	Remarks.

APPLICATION AND ALLOTMENT BOOK. *6-33.*

(Headings.)

No. of Application.	Date of Application.	Name.	Address.	Occupation.

(Headings continued.)

No. of Shares Applied for.	No. of Shares Allotted.	The Respective Numbers of the Shares. Allotted.		Deposit Paid on Application.	Balance to be Paid on Allotment.	Total Paid on Application and Allotment.	Amount of Deposit Returned.	Share Ledger Folio.	Certificate No.	Remarks.
		From.	To.							

CALL LIST. *6-34.*

Date of Call.	No. of Allotment.	Name.	Address.	Occupation.	Amount of Call per Share.	No. of Shares.	Reg. Fo.	Amount Payable.	Date Paid.	Share Cash Book Folio.

Secretarial and Share Books.

15. Share Certificate Book.

An ordinary form of Share Certificate is shewn. The Share Certificates should be bound up in book form with counterfoils attached, giving the necessary written particulars as appearing in the Share Certificates themselves.

A slip form of receipt is annexed to the Certificate and perforated. This is a convenient method of obtaining an acknowledgment of the Certificate; and particular care should be taken that this slip is returned, duly completed, and either pasted on the counterfoil of the Certificate, or in a guard book, so that in case of the loss of the Certificate, and consequent demand for the usual declaration and indemnity, its delivery can be immediately proved.

The most convenient method of preserving cancelled Certificates is to paste them on to their counterfoils.

16. Dividend and Interest Lists.

A convenient form of list for dividends and interest paid is shewn. The form calls for no special comment.

17. Share and Debenture Holders' Address Book.

A ruling suitable for this book is shewn. It will be found most convenient to adopt a loose or removable leaf system for this purpose. The book is intended to contain the complete addresses of all holders of shares and debentures and other classes of capital issued. The removable leaf arrangement enables the strict alphabetical order to be preserved, and if it is necessary to circularise shareholders at short notice the addressing work can be carried out very quickly, as it is possible to divide it between any number of clerks.

SHARE CERTIFICATE. *6-35.*

CERTIFICATE OF SHARES.

No................

No. of Shares......................
Nos...............to ....
Issued to..........................
....
of ....
....
Date..................................
Entered on Register....... .....
....

Received the .... day of .... 19 Certificate No..........
for ....Shares in .... Co., Limited.
Shareholder's or Broker's Signature...

No....................

....

LIMITED.

Incorporated under the Companies (Consolidation) Act, 1908.

CAPITAL £
DIVIDED INTO SHARES OF £1 EACH.

THIS IS TO CERTIFY THAT..
of...
is the holder of..Shares fully paid of £1 each Numbered......................to......................inclusive in the above-named Company subject to the Memorandum and Articles of Association thereof.

GIVEN under the Common Seal of the said Company, the.................day of.....................19.......

....
.... } *Directors.*

....
Secretary.

The Company will not transfer any of the above shares without the production of a certificate relating to such shares, which certificate must be surrendered before any deed of transfer, whether for the whole or any part thereof, can be registered or a new certificate given in exchange.

DIVIDEND AND INTEREST LISTS. *6-36.*

Dividend No..................on.....................for....................ending..........................

Warrant No.	Name of Payee.	Address.	Ledger Folio.	No. of Shares or Amount of Debentures.	Amount of Dividend at % p. a.	Less Income Tax at in the £.	Amount of Warrant.	Date of Payment.	Remarks.

SHARE AND DEBENTURE HOLDERS' ADDRESS BOOK. *6-37.*

Surname.	Christian Name.	Address.	Occupation.	Holding.					
				Ordinary.		Preference.		Debentures.	
				Reg. Fo.	Shares.	Reg. Fo.	Shares.	Reg. Fo.	Amount.

Section **VI f**

Private Accounts.

Private Account Books.

BOOKS recommended :

- Private Cash Book.
- Share Cash Book.
- Private Ledger.
- Manufacturing Ledger.
- Private Journal.
- Private Balances Book.

Private Cash Book.

This book contains the summary of all the cash transactions and shews them in a very simple form. The notes give clearly the source of the various items and the method of posting. The Bank Balance is ascertainable at once by casting the columns and taking the difference. For the purpose of shewing the total transactions over a given period it is convenient to carry forward the totals of the inner cash columns for, say, a whole year, although the balance may be brought down monthly in the outer cash columns.

The Accountant will have sole charge of the book, and there is no need for any other member of the staff to have access to it.

Share Cash Book.

This book should contain only receipts and payments on account of Share Capital or Debentures. It serves to relieve the Private Cash Book of details.

The receipts and payments should be totalled weekly, the totals being posted to their respective accounts in the Private Ledger and transferred to the Private Cash Book as shewn. The details should be posted to the members accounts in the Share or Debenture Ledgers.

PRIVATE CASH BOOK. (*Debit Side.*)

6-38.

Date.		Particulars.	Posting Reference.	Bank.	Total.
1913					
Jan.	1	To Balance brought forward..................from folio		55,000 0 0	55,000 0 0
,,	2	,, Bills Receivable—Bill No. 101—Smith & Co.		100 0 0	
,,	4	,, Pupils' Premiums—Premium for Articles of G. Brown for 3 years at £100 per annum		300 0 0	
,,	7	,, Receipts as per Sales Cash Book	Private Journal.	2,400 0 0	2,800 0 0

PRIVATE CASH BOOK. (*Credit Side.*)

Date.		Particulars.	Posting Reference.	Bank.	Total.
1913					
Jan.	1	By Income tax Commissioners—Paid tax on Profits		1,600 0 0	
,,	4	,, Bills Payable—Bill No. 28—G. Brown		2,500 0 0	
,,	5	,, Imperial Foreign Government Deposit with tender		1,000 0 0	
,,	7	,, Payments as per Bought Cash Book	Private Journal.	3,070 0 0	8,170 0 0

SHARE CASH BOOK. (*Debit Side.*)

6-39.

Date.		Name of Shareholder or Debenture holder.	Posting Reference.	Share or Deb. Ledger Folio.	Amount.	Total.
1910						
Apl.	14	To Allotment a/c—				
		A. Blank			2,500 0 0	
		D. Blank			2,500 0 0	
		G. Brown			2,500 0 0	
		A. Robinson			5,000 0 0	
		W. Owen			3,750 0 0	
						16,250 0 0
May	3	,, Call Account—				
		A. Blank			5,000 0 0	
		D. Blank			5,000 0 0	
						10,000 0 0
,,	10	,, G. Brown			5,000 0 0	
		A. Robinson			10,000 0 0	
		W. Owen			7,500 0 0	
						22,500 0 0
		,, Transferred to Private C.B. folio				400 0 0
						£49,150 0 0

SHARE CASH BOOK. (*Credit Side.*)

Date.		Name of Shareholder or Debentureholder.	Posting Reference.	Share or Deb. Ledger Folio.	Amount.	Total.
1910						
Apl.	14	By Application money returned—				
		A. Smith			100 0 0	
		W. Thomas			100 0 0	
		R. Jones			200 0 0	
						400 0 0
		,, Transferred to Private C.B. folio				16,250 0 0
May	3	,, ,, ,,				10,000 0 0
,,	10	,, ,, ,,				22,500 0 0
						£49,150 0 0

Private Ledger.

Private Ledger.

The ruling of this book is in the simple form as shewn in the various specimen accounts. It should contain all the accounts dealing with Capital receipts, including Debentures, Capital Expenditure, also the Profit and Loss Accounts as distinct from the Manufacturing Accounts contained in the Manufacturing Ledger, and the various adjustment accounts.

The book should be written up by the Accountant personally, and should not be accessible to any other member of the staff.

Without providing for special circumstances, the accounts shewn hereafter will be found useful and necessary :

Receipts on Account of Capital and Debentures.

Ordinary Shares Capital Account.
,, ,, Application and Allotment Account.
,, ,, Call Account.
Preference Shares Capital Account.
,, ,, Application and Allotment Account.
,, ,, Call Account.
Debentures Account.
,, Application and Allotment Account.

The specimen accounts shewn deal only with the Ordinary Shares. The accounts dealing with the Preference Shares and Debentures should follow the same system, and it is therefore unnecessary to shew them in detail. The Cash entries in the Application, Allotment and Call Accounts should be posted from the Share Cash Book as shewn. Under date of the allotment of the shares by the Board, a Journal entry should be made crediting Ordinary Share Capital Account and debiting Ordinary Shares Application and Allotment Account with the total amount due in respect of application and allotment money on the shares allotted. On the date the calls become due, similar entries should be made from Calls Account to the Capital Account. The effect is that the Capital Account shews the total capital subscribed and payable, and the Application and Allotment and Calls Accounts the amount in arrear.

Capital Expenditure Accounts.

Business Purchase Account.
Preliminary Expenses.
Goodwill Account.
Patents, Drawings and Patterns.
Jigs and Special Tools.
Land and Buildings.
Motive Power Plant.
Mechanical Transmission.
Electrical Transmission.
Pipe Transmission.
Transportation Plant.
Shop Fixtures.
Special Process Plant.
Machines.
Loose Plant and Tools.
Office Furniture and Fittings—Works.
,, ,, ,, General.

The first three accounts on the list are of a special nature, and, therefore, examples of them have been shewn in full. The remaining accounts are illustrated by examples of the Jigs and Special Tools, Land and Buildings, and Loose Plant and Tools Accounts.

G-40.

PRIVATE LEDGER.

ORDINARY SHARES CAPITAL ACCOUNT.

Dr.							*Cr.*
				1910 Mar.	31	By Business Purchase a/c, 10,000 Shares allotted in part payment of purchase money J.	10,000 0 0
				„	„	„ Application and Allotment a/c, Amount due being 10/- per share on 65,000 Shares J.	32,500 0 0
				Apl.	30	„ Call a/c J. Do. Do.	32,500 0 0
							£75,000 0 0

ORDINARY SHARES APPLICATION AND ALLOTMENT ACCOUNT.

Dr.							*Cr.*
1910 Mar.	31	To Ordinary Share Capital a/c, Amount due on application and allotment, being 10s. per Share on 65,000 Shares J.	32,500 0 0	1910 Mar.	31	By Cash, Amount received on application for 65,000 Shares as per application list (*Share C.B.*)	16,250 0 0
				Apl.	14	„ Cash — Amount received on allotment (*Share C.B.*)	16,250 0 0
			£32,500 0 0				£32,500 0 0

ORDINARY SHARES CALL ACCOUNT.

Dr.							*Cr*
1910 Apl.	30	To first and final call of 10s. per Share on 65,000 Shares J.	32,500 0 0	1910 May	3	By Cash (*Share C.B.*)	10,000 0 0
				„	10	„ „ „ „	22,500 0 0
			£32,500 0 0				£32,500 0 0

Private Ledger.

Business Purchase Account.

It will be noted that the Business Purchase Account as shewn contains a summary entry of the whole of the Assets and Liabilities taken over on the assumption that the business has been purchased as a going concern. The detail Journal entries of the postings to the account are shewn under the Private Journal section. It has been assumed that the purchase price of the business has been paid partly in cash and partly by the issue of fully paid up shares.

Preliminary Expenses Account.

The entries in the Preliminary Expenses Account as shewn consist of the expenses of this nature which the Company is liable to pay in accordance with the terms of the Prospectus and the agreements referred to therein. Such expenses may cover Company Registration Fees, Law Costs, Cost of Advertising and Printing Prospectus, etc. It is the usual practice to write off this account out of the profits as quickly as possible.

Goodwill Account.

This is illustrated. Many differences of opinion exist as to the treatment of a Goodwill Account. There is no obligation to write off the Goodwill before payment of dividends, and, therefore, no entry has been shewn for such writing off. In many cases of companies earning large profits it will be found, however, that the Goodwill has been completely written off out of profits at a time when it undoubtedly is a very considerable asset by reason of such profits.

PRIVATE LEDGER—*Continued.*

6-40 contd.

BUSINESS PURCHASE ACCOUNT.

Dr.						*Cr.*
To Cash, (Private C.B.)		100,000 0 0		By Sundries as per detailed journal entry, making up purchase price	J.	120,000 0 0
,, Ordinary Shares allotted in part payment of purchase money, 10,000 Shares of £1 each fully paid up	J.	10,000 0 0				
,, Preference Shares allotted in part payment of purchase money—10,000 Shares of £1 each fully paid up	J.	10,000 0 0				
		£ 120,000 0 0				£ 120,000 0 0

PRELIMINARY EXPENSES ACCOUNT.

Dr.						*Cr.*
To Cash: Press Agency, Ld., for advertising prospectus		1,750 0 0		By Transfer from Profit and Loss appropriation a/c	fo.	3,000 0 0
,, Do. Bond and Stocks—Broker's fees and Brokerages		1,000 0 0		,, Balance	c/d	1,000 0 0
,, Stamp Duty		500 0 0				
,, Accountant's Charges		250 0 0				
,, Legal Charges		500 0 0				
		£ 4,000 0 0				£ 4,000 0 0
To Balance	b/d	1,000 0 0				

GOODWILL ACCOUNT.

Dr.						*Cr.*
To Sundries—Goodwill, as per Purchase Agreement dated	J.	20,000 0 0				

Private Ledger.

Jigs and Special Tools Account.

Loose Plant and Tools Account.

These accounts are set out. The stock should be taken of both classes when the Balance Sheet is made up. The Works Manager should be competent to arrive at the proper values to be placed upon these stocks, looked at from the point of view of their worth to him for manufacturing purposes. Having arrived at the stock figures, the balances of the accounts as shewn should be charged to the Repairs to Jigs and Special Tools Account and the Repairs to Loose Plant and Tools Accounts, which accounts in their turn will be charged to the debit of Works Profit and Loss Account.

Land and Buildings Account.

This account is illustrated. The opening values of the Land, Buildings, Plant, and other accounts mentioned in the foregoing list, will be based in nearly every case on figures arrived at by an expert valuer. In order to settle the question of depreciation, it is recommended that the valuer should be asked to fix the rate of depreciation to be written off each class of asset. These rates can be revised from time to time by consultation with the valuer, and, if this arrangement is adopted, any possible friction is avoided as between Directors and Auditors when the Balance Sheet is prepared. The rates of depreciation mentioned in the specimen account must not be taken as a recommendation in any way, because it is practically impossible to make any useful recommendation which would cover the varying conditions of the different classes of engineering and manufacturing undertakings. Some suggestions with regard to particular classes of plant are made under Works Accounts.—Section IV h.

6-40. *contd.*

PRIVATE LEDGER—*Continued.*

JIGS AND SPECIAL TOOLS ACCOUNT.

Dr.			£	s.	d.			Cr.	£	s.	d.
1913						1913					
Jan.	1	To Stock at this date	2,900	0	0	Dec.	31	By Repairs to Jigs and Special Tools—Amount written off to reduce to valuation figure at this date	311	0	0
,,	14	To Works Cost allocation abstract No. 1—Additions to date	10	11	8	,,	,,	By Balance, being valuation at this date	3,000	0	0
		Note—Entry each fortnight as above totalling	400	8	4						
			£ 3,311	0	0				£ 3,311	0	0
1913											
Dec.	31	To Balance—Stock at this date	3,000	0	0						

LOOSE PLANT AND TOOLS ACCOUNT.

Dr.			£	s.	d.			Cr.	£	s.	d.
1913						1913					
Jan.	1	To Stock at this date	11,500	0	0	Dec.	31	By Repairs to Loose Plant and Tools—Amount written off to reduce to valuation figure at this date	2,000	0	0
,,	14	,, Works Cost allocation abstract No. 1 additions to date	100	1	6	,,	,,	,, Balance, being valuation at this date	12,000	0	0
		Note—Entry each fortnight as above totalling	2,399	18	6						
			£ 14,000	0	0				£ 14,000	0	0
1913											
Dec.	31	To Balance Stock at this date	12,000	0	0						

LAND AND BUILDINGS ACCOUNT.

Dr.			£	s.	d.			Cr.	£	s.	d.
1913						1913					
Jan.	1	To Balance, being value at this date	40,825	0	0	Dec.	31	By Depreciation J.	1,975	0	0
						,,		,, Balance c/d	40,000	0	0
,,	14	,, Additions as per Works Cost allocation abstract No. 1	100	1	1						
		Note—Entry each fortnight as above totalling	1,049	18	11						
			£ 41,975	0	0				£ 41,975	0	0
1913											
Dec.	31	To Balance, being value at this date	40,000	0	0						

Private Ledger.

Dividends and Debenture Interest Accounts.

The following is a list of accounts dealing with Dividends and Debenture Interest :

Ordinary Shares Dividend Account.
,, ,, Dividend Cash Account.
,, ,, Unclaimed Dividends Account.
Preference Shares Dividend Account.
,, ,, Dividend Cash Account.
,, ,, Unclaimed Dividends Account.
Debenture Interest Account.
,, ,, Cash Account.
,, ,, Unclaimed Account.

Specimen accounts relating to the Ordinary Shares only are shewn—the other two sections being treated on the same system. It will be noted that the total dividend declared is transferred from the Profit and Loss Appropriation Account to the credit of the Dividend Account. The actual cash payable to the shareholders is then transferred from Dividend Account to the credit of Dividend Cash Account. The balance on the Dividend Account representing the Income Tax deducted from the Dividends payable to shareholders, should be transferred as shewn to the credit of Income Tax Reserve Account. The cash transferred to the separate Banking Account to meet the Dividends payable to shareholders is posted from the Private Cash Book to the debit of Dividend Cash Account. When the accounts of the Company are again made up, a Journal entry should be made debiting Dividends Cash Account and crediting Unclaimed Dividends Accounts with the dividends unclaimed at the date of the preparation of the Balance Sheet ; the total amount agreeing with the total of the unpresented Dividend Warrants as shewn on the dividend list.

Profit and Loss Appropriation Account.

This account as shewn will open with the balance brought forward from the previous year. It will be credited with the profit for the current year and debited with the various appropriations sanctioned at the General Meeting, the credits for these items being passed to the various accounts affected by them, such as Debenture Interest Accounts, Dividends Account, Preliminary Expenses, etc.

PRIVATE LEDGER—*Continued.*

6-40. contd.

ORDINARY SHARES DIVIDEND ACCOUNT.

Dr.									Cr.
1913 Mar.	31	To Dividend Cash a/c fol.		7,062 10 0	1913 Mar.	31	By Profit and Loss Appropriation a/c—Dividend of 10 % on 75,000 Ordinary Shares J.		7,500 0 0
,,	,,	,, Income Tax Reserve a/c J.		437 10 0					
				£7,500 0 0					£7,500 0 0

ORDINARY SHARES DIVIDEND CASH ACCOUNT.

Dr.									Cr.
1913 Mar.	31	To Cash		7,062 10 0	1913 Mar.	31	By Dividend a/c, folio		7,062 10 0
Dec.	31	,, Unclaimed Dividends J.		75 0 0	Dec.	31	,, Balance c/d		75 0 0
				£7,137 10 0					£7,137 10 0
1913 Dec.	31	To Balance b/d		75 0 0					

ORDINARY SHARES UNCLAIMED DIVIDENDS ACCOUNT.

Dr.									Cr.
					1913 Dec.	31	By Div. Cash a/c J.		75 0 0

PROFIT AND LOSS APPROPRIATION ACCOUNT.

Dr.									Cr.
1913 Mar.	31	To Preliminary Expenses		1,000 0 0	1913 Jan.	1	By Balance		19,500 0 0
,,	,,	,, Reserve a/c		4,000 0 0	Dec.	31	,, Profit and Loss a/c Profit for year ending 31st December, 1913		23,000 0 0
,,	,,	,, Preference Share Dividend		5,700 0 0					
,,	,,	,, Ordinary Share Dividend		7,500 0 0					
,,	,,	,, Debenture Interest		2,500 0 0					
,,	,,	,, Balance		21,800 0 0					
				£42,500 0 0					£42,500 0 0
					1913 Dec.	31	By Balance		21,800 0 0

Private Ledger.

Profit and Loss Account.

This account is shewn in full detail—all the various items being transferred direct from the separate accounts in the Private Ledger, with the exception of the Works Profit and Loss Account balance, which is transferred from the Manufacturing Ledger. The balance on the Profit and Loss Account shews the result for the period covered by the accounts, and is transferred direct to the Profit and Loss Appropriation Account.

Detail Profit and Loss Accounts.

A complete list of the various Profit and Loss Accounts which will probably be required is shewn below, under the heading "Profit and Loss Account." It is unnecessary to repeat the list or give the entries shewn in each of these separate accounts in the Private Ledger. A few of the accounts, typical of the whole, have been selected, and the detail entries therein shewn on the opposite page. These accounts are Advertising, Directors' Fees, General Office Stationery and Supplies, Income Tax, and Show and Demonstration Expenses. The majority of the entries in these accounts are postings from the Journal, based on the analysis of the Bought and Bought Returns Books and Petty Disbursements. The remainder are represented by adjustments and special receipts and payments posted direct from the Private Cash Book.

6-40. contd.

PRIVATE LEDGER—*Continued.*

Dr. PROFIT AND LOSS ACCOUNT. *Cr.*

1913					1913				
Dec.	31	To Advertising		2,350 0 0	Dec.	31	By Works Profit and Loss Account balance transferred		50,000 0 0
		,, Agent's Commissions		1,750 0 0			,, Discounts		750 0 0
		,, Bad Debts		550 0 0			,, Royalties		1,000 0 0
		,, Bank Charges and Interest		275 0 0			,, Transfer fees		40 0 0
		,, Debenture Trustees' fees		150 0 0					
		,, Depreciation of General Office Buildings, Furniture, Fittings, etc.		200 0 0					
		,, Directors' fees		950 0 0					
		,, General Office Heating, Cleaning, Lighting, etc.		250 0 0					
		,, Rent, Rates, Taxes, Insurance, etc.		200 0 0					
		,, Stationery and Supplies		400 0 0					
		,, Office Equipment Repairs		50 0 0					
		,, General Travelling Expenses		650 0 0					
		,, Income tax		1,000 0 0					
		,, Law Costs		100 0 0					
		,, Management and General Office Salaries		10,000 0 0					
		,, Stamps, Telegrams, and Petties		715 0 0					
		,, Show and Demonstration Expenses		2,500 0 0					
		,, Tendering Expenses		2,950 0 0					
		,, Travellers' Salaries and Expenses		3,750 0 0					
		,, Balance, being profit for the year ending 31st December, 1913, transferred to Profit and Loss Appropriation A/c		23,000 0 0					
				£51,790 0 0					£51,790 0 0

6-40. contd.

PRIVATE LEDGER—*Continued.*

Dr. ADVERTISING ACCOUNT. *Cr.*

1913				1913			
Jan.	31	To Cash — Advertising Agent's special fee	100 0 0	Dec.	31	By Returns J.	150 0 0
		,, Purchases	100 0 0	,,	,,	,, Profit and Loss a/c fol.	2,350 0 0
,, ,,	,, ,,	,, Wages and Petty Ledger Adjustment a/c	20 0 0				
		Note—Similar monthly entries through the year totalling	2,280 0 0				
			£2,500 0 0				£2,500 0 0

Dr. DIRECTORS' FEES ACCOUNT. *Cr.*

1913				1913			
June	30	To Cash, fees for half year, less tax	447 5 10	Dec.	31	By Profit and Loss a/c fol.	950 0 0
Dec.	,,	,, Balance, fees accrued to date c/d	447 5 10				
,,	,,	,, Income Tax reserve a/c, tax deducted fol.	55 8 4				
			£950 0 0				£950 0 0
				1913			
				Dec.	31	By Balance	447 5 10

Dr. GENERAL OFFICE STATIONERY AND SUPPLIES. *Cr.*

1913				1913			
Mar.	31	To Purchases J.	85 0 0	Apl.	30	By Returns	5 0 0
June	30	,, ,, J.	60 0 0	Oct.	31	,, ,,	3 17 6
,,	,,	,, Wages and Petty Adjustment a/c J.	45 0 0	Dec.	31	,, ,,	7 2 6
,,	,,	,, Cash Purchases, filing cabinet	10 5 0	,,	,,	,, Stock at this date c/d	(not valued)
Sept.	30	,, Purchases	100 0 0	,,	,,	,, Profit and Loss a/c folio	400 0 0
,,	,,	,, Sundries J.	25 15 0				
Dec.	31	,, Purchases	54 10 0				
,,	,,	,, Wages and Petty Ledger Adjstmt. J.	35 10 0				
			£416 0 0				£416 0 0
1913							
Dec.	31	To Stock at this date	(not valued)				

Dr. INCOME TAX ACCOUNT. *Cr.*

1913				1913			
Jan.	31	To Cash tax on Directors' and Debenture Trustees' fees	64 3 4	Jan.	1	By Balance J.	750 0 0
June	30	,, Cash Tax on Profits	1,000 0 0	Dec.	31	,, Ordinary Dividend a/c, Tax deducted	437 10 0
Dec.	31	,, Balance c/d	1,665 16 8			,, Preference Dividend a/c, Tax deducted	332 10 0
						,, Debenture Interest a/c. Tax deducted	145 16 8
						,, Directors' fees a/c, Tax deducted	55 8 4
						,, Debenture Trustees' fees a/c, Tax deducted	8 15 0
						,, Profit and Loss—Reserve for Income Tax on Profits	1,000 0 0
			£2,730 0 0				£2,730 0 0
				1913			
				Dec.	31	By Balance b/d	1,665 16 8

Dr. SHOW AND DEMONSTRATION ACCOUNT. *Cr.*

1913				1913			
Mar.	31	To Purchases J.	500 0 0	Dec.	31	By Profit and Loss a/c	2,500 0 0
June	30	,, Cash—Deposit for Space at Show	100 0 0				
,,	,,	,, Purchases	1,000 0 0				
Dec.	,,	,, ,,	900 0 0				
			£2,500 0 0				£2,500 0 0

Private Ledger.

Sales Account.

This account is shewn. It is written up as regards the credit side from Journal entries for the total shewn by the Sales Day Book or Sheets, and as regards the debit side from Journal entries for the totals shewn by the Sales Returns Book or Sheets. It is simply an intermediate account for summarising Sales and Sales Returns, so that the net total for the year may be transferred to the Sales Orders Account.

Sales Repairs and Sundries Account.

This account is written up in the same form as the Sales Account above mentioned, with the exception that an additional journal entry is shewn on the credit side for the total of the Cash Sales as appearing in the Wages and Petty Ledger.

Adjustment Accounts.

The following Adjustment Accounts are shewn in detail :

Wages and Petty Ledger Adjustment Account.
Bought Ledger ,, ,,
Sales Ledger ,, ,,

The entries shewn in these accounts are posted from the Private Journal, and under the section describing the use of this book the whole of the necessary entries are shewn. It is suggested that these adjustment accounts should be closed monthly and agreed with the respective adjustment accounts shewn in the Wages and Petty, and Bought and Sales Ledgers. By this arrangement a complete and frequent check is obtained by the Accountant of the whole of the system of book-keeping under his charge. It provides also a systematic means of keeping the accounts up to date.

6-40. contd.

PRIVATE LEDGER—*Continued.*

SALES ACCOUNT.

Dr.							*Cr.*
1913				1913			
Jan.	31	To Sales Ledger Adjustment a/c Returns during the month J.	5 0 0	Jan.	31	By Sales Ledger Adjustment a/c Sales during the month J.	567 0 0
		Note—Similar entries monthly during the year amounting to	995 0 0			*Note*—Similar entries monthly during the year amounting to	85,433 0 0
Dec.	31	To Sales orders a/c Balance transferred	85,000 0 0				
			£86,000 0 0				£86,000 0 0

SALES REPAIRS AND SUNDRIES ACCOUNT.

Dr.							*Cr.*
1913				1913			
Jan.	31	To Sales Ledger Adjustment Account Returns during the month J.	25 0 0	Jan.	31	By Sales Ledger Adjustment a/c Sales during the month J.	650 0 0
		Note—Similar Entries monthly during the year amounting to	175 0 0			*Note* - Similar Entries monthly during the year amounting to	7,350 0 0
Dec.	31	To Sales Repairs and Sundries Orders Account	7,900 0 0	,,	,,	By Wages and Petty Ledger Adjustment a/c. Cash Sales during the month	1 5 0
						Note—Similar entries monthly during the year amounting to	98 15 0
			£8,100 0 0				£8,100 0 0

WAGES AND PETTY LEDGER ADJUSTMENT ACCOUNT.

Dr.							*Cr.*
1913				1913			
Jan.	1	To Balance	100 0 0	Jan.	31	By Cash Iron Trades I.A.	10 0 0
,,	,,	,, Cash	100 0 0	,,	,,	,, Sundry Payments during the month as summarised in Journal J.	1,105 15 0
,,	6	,, Bank	1,000 0 0	,,	,,	,, Balance	85 10 0
,,	31	,, Petty Sales J.	1 5 0				
			£1,201 5 0				£1,201 5 0
Jan.	31	To Balance	85 10 0				

BOUGHT LEDGER ADJUSTMENT ACCOUNT.

Dr.							*Cr.*
1913				1913			
Jan.	31	To Cash	622 15 0	Jan.	31	By Works Purchases	1,180 0 0
,,	,,	,, Discounts	12 10 0	,,	,,	,, Works Disbursements	100 0 0
,,	,,	,, Works Returns	235 0 0	,,	,,	,, General Purchases	116 5 0
,,	,,	,, General Returns	4 5 0	,,	,,	,, Debtors	27 10 0
,,	,,	,, Bills Payable	250 0 0				
,,	,,	,, Creditors	299 5 0				
			£1,423 15 0				£1,423 15 0
Jan.	31	To Debtors	27 10 0	Jan.	31	By Creditors	299 5 0

Note—The entries for the Cash and Discounts must be made each week. The remaining entries each month.

SALES LEDGER ADJUSTMENT ACCOUNT.

Dr.							*Cr.*
1913				1913			
Jan.	31	To Sales J.	500 0 0	Jan.	31	By Cash	195 0 0
		,, Sales Repairs and Sundries J.	67 0 0			,, Discounts	5 0 0
		,, Creditors	100 0 0			,, Returns—Sales	4 0 0
						,, Do. Repairs and Sundries	1 0 0
						,, Bills receivable	100 0 0
						,, Debtors	362 0 0
			£667 0 0				£667 0 0
Jan.	31	To Debtors	362 0 0	Jan.	31	By Creditors	100 0 0

Note—The entries for the Cash and Discounts must be made each week. The remaining entries each month.

Manufacturing Ledger.

Manufacturing Ledger.

This ledger should contain the whole of the accounts having reference to the manufacture of the product of the works, with the exception of the Capital Expenditure Accounts appearing in the Private Ledger. The particulars for writing up this ledger will be contained in the Works Cost Allocation Abstract, which must be journalized as shewn under the Private Journal section. It will be necessary to open the following accounts to cover the items shewn in the Works Cost Allocation Abstracts, and these may be divided conveniently into the sections shewn.

Works Expense Accounts.

Repairs and Renewals—Patterns.
,, ,, Jigs and Special Tools.
,, ,, Land and Buildings.
,, ,, Motive Power Plant.
,, ,, Mechanical Transmission.
,, ,, Electrical Transmission.
,, ,, Pipe Transmission.
,, ,, Transportation Plant.
,, ,, Shop Fixtures.
,, ,, Special Process Plant.
,, ,, Machines.
,, ,, Loose Plant and Tools.
,, Office Furniture and Fittings—Works.
Power Generation Expenses.
Power from Outside sources.
Heating Expenses.
Lighting Expenses.
Building Attendance.
Mechanical Plant Attendance.
Electrical Plant Attendance.
Belting Attendance.
Tool Dressing and Sharpening.
Plant Removals and Alterations.
Rent, Rates, Taxes and Fire Insurance and Fire Prevention.
Works Management and Administration.
Drawing Office General Charges.
Works Stationery.
Sundry Minor Expenses.
General Stores and Warehouse Expenses.
Sundry Carriage and Package Expenses.
Material Testing and Treatment.
Timber preparation and Storage.
Interdepartmental Transportation.
Accident Compensation.
National Insurance Expenses.
Shop Stores Expenses.
Shop Supplies.
Overtime Charges.
General Labouring.
Shop Supervision and Inspection.

The same system of writing up is applicable to the whole of the above accounts, and, therefore, the first account, viz., Repairs and Renewals to Land and Buildings, is the only one illustrated in detail.

Depreciation Account.

This account is shewn in detail on the opposite page. The amounts entered must not be taken in any way as representing rates of depreciation recommended for writing off the various accounts.

MANUFACTURING LEDGER.

6-41.

Dr. REPAIRS AND RENEWALS, LAND AND BUILDINGS. *Cr.*

1913 Jan.	14	To Works Cost Allocation Abstract No. 1		10 12 3	1913 Dec.	31	By Works Expenses Allocation a/c		300 0 0
		Note—Similar entry each fortnight totalling,		289 7 9					
			£	300 0 0				£	300 0 0

Dr. DEPRECIATION ACCOUNT. *Cr.*

1913 Dec.	31	To Depreciation written off following Accounts	J.		1913 Dec.	31	By Works Expenses allocation a/c		6,950 0 0
		,, Freehold & Leasehold Land and Buildings		1,975 0 0			,, By Profit and Loss Account		200 0 0
		,, Motive Power Plant		275 0 0					
		,, Mechanical transmission		350 0 0					
		,, Electrical transmission		250 0 0					
		,, Pipe transmission		175 0 0					
		,, Transportation Plant		450 0 0					
		,, Shop Fixtures		175 0 0					
		,, Special Process Plant		500 0 0					
		,, Machines		1,875 0 0					
		,, Office Furniture and Fittings (Works)		75 0 0					
		,, Do. do. (General)		50 0 0					
		,, Patents, Drawings and Patterns		1,000 0 0					
			£	7,150 0 0				£	7,150 0 0

Manufacturing Ledger.

Process Accounts { *Iron Foundry.*
Brass Foundry.
Smithy.

The Iron Foundry Account is shewn. The other two accounts are written up in the same manner and consequently have not been shewn. The account is debited with the Iron Foundry Work-in-Progress and Stock at the beginning of the year, and with the Materials, Wages, and Shop Charges (Works Expenses), chargeable to it during the year, as shewn by the Works Cost Allocation Abstracts. The output of the Iron Foundry, as shewn by the Works Products Abstracts, is credited to it at a price as near cost as possible and debited to Works Materials Suspense Account. The Work-in-Progress and Stock at the end of the year is then credited, and the balance of the account, being either Profit or Loss on working during the year, is transferred to the Works Profit and Loss Account.

It will be noticed that columns are provided for shewing the separate figures of Materials, Disbursements, Wages, and Shop Charges debited to the account during the year. The totals of these separate columns are used for the purpose of shewing the figures making up the amounts appearing in the Works Profit and Loss Account as prepared for inclusion in the annual accounts.

Stock Manufacturing Account.

This account is shewn in detail.

It is debited with the Work-in-Progress at the beginning of the year, and with the Materials, Wages, and Shop Charges (Works Expenses), chargeable to the product during the year, as shewn by the Works Cost Allocation Abstracts. The output, as shewn by the Works Products Abstract, is credited to it and debited to Works Materials Suspense Account at a price as near cost as possible. The Work-in-Progress at the end of the year is then credited; the balance of the account, being either profit or loss on working during the year, is transferred to the Works Profit and Loss Account.

The reason for the provision of separate columns for Materials, Disbursements, Wages, and Shop Charges is explained under the heading of " Iron Foundry Account."

6-41. contd.

MANUFACTURING LEDGER—*Continued.*

IRON FOUNDRY ACCOUNT. (*Debit Side*)

			Materials.	Disbursements.	Wages.	Shop Charges.		
1913 Jan.	1	To Work in Progress and Stock at this date						300 0 0
,,	14	,, Works Cost Allocation Abstract No. 1	31 2 7		68 19 0	15 0 0		115 1 7
		Note—Similar entries during the year making up a total of						985 19 6
Dec.	31	To Profit transferred to Works Profit and Loss a/c						50 0 0
							£	1,451 1 1
1913 Dec.	31	To Stock and Work in Progress at this date						250 0 0

IRON FOUNDRY ACCOUNT. (*Credit Side*)

1913 Jan.	14	By Works Products Abstract		101 1 1
		Note—Similar entries during the year amounting to		1,100 0 0
Dec.	31	By Stock and Work in Progress at this date		250 0 0
			£	1,451 1 1

STOCK MANUFACTURING ACCOUNT. (*Debit Side*)

			Materials.	Disbursements.	Wages.	Shop Charges.		
1913 Jan.	1	To Work in Progress						1,000 0 0
,,	14	,, Works Cost Allocation Abstract	63 1 7		97 1 1	103 2 1		263 4 9
		Note—Similar entries through the year making a total of						1,936 15 3
Dec.	31	To Works Profit and Loss Account						150 0 0
							£	3,350 0 0
1913 Dec.	31	To Stock and Work in Progress						1,100 0 0

STOCK MANUFACTURING ACCOUNT. (*Credit Side*)

1913 Jan.	14	By Works Products Abstract		204 4 4
		Note—Similar entries through the year making a total of		2,045 15 8
Dec.	31	By Stock and Work in Progress at this date		1,100 0 0
			£	3,350 0 0

Manufacturing Ledger.

Sales Orders Account.

This account is shewn in full. It is debited with the value of the Work-in-Progress at the beginning of the year. The Materials, Disbursements, Wages, and Shop Charges (Works Expenses) charged to the debit of the account during the year are obtained from the Works Cost Allocation Abstracts. The Sales credited to the account are transferred from Sales Account. There are also further credits for the stock value of goods returned from customers. These credits are obtained from the Works Products Abstracts. The final credit, being the value of Work-in-Progress, is obtained from the Works Accounts Annual Abstract. The balance on the account representing Profit or Loss is transferred to the Works Profit and Loss Account.

In many engineering and manufacturing undertakings it will be advisable to keep the records of orders, both as regards costs and sales, under several classes, in which case it will be necessary to open as many accounts as classes of orders in use. In the system here explained, provision is made for two classes, " Sales Orders " and " Sales Repairs and Sundries Orders."

Sales Repairs and Sundries Orders Account.

This account is concerned with Repairs and Sundries Orders received for execution, which are dealt with both in the Works and Financial Accounts as distinct from the ordinary Sales Orders. The method of writing up the account is exactly the same as in the case of the Sales Orders Account, and, therefore, it has not been considered necessary to illustrate it in detail.

Development and Experimental Orders Account.

This account is shewn in detail. It is written up from the Works Cost Allocation Abstract, so far as the debit side is concerned. At the end of the year the position should be reviewed by the management, and if it is decided to carry forward any portion of the expenditure on this account, the amount decided upon is reported in the Works Accounts Annual Abstract and brought down upon the account. The balance is transferred to the debit of Works Profit and Loss Account.

Scrap Account.

This account is shewn in detail. The credits are obtained by postings from the Works Products Abstract. They represent the value of Scrap which cannot be credited against the cost of individual orders. The balance of the account is transferred direct to Works Profit and Loss Account.

6-41. contd.

MANUFACTURING LEDGER—*Continued.*

SALES ORDERS ACCOUNT. (*Debit Side*)

			Materials.	Disbursements.	Wages.	Shop Charges.	
1913 Jan.	1	To Work in Progress—Sales Orders					15,000 0 0
,,	14	To Works Cost Allocation Abstract No. 1	413 9 7	81 7 2	173 10 2	111 3 7	779 10 6
		Note—Similar entries during the year making a total of					49,420 9 6
Dec.	31	To Works Profit and Loss Account					48,000 0 0
						£	113,200 0 0
1913 Dec.	31	To Work in Progress at this date					28,000 0 0

SALES ORDERS ACCOUNT. (*Credit Side*)

1913 Jan.	14	By Works Products Abstract—Stock Value of Returns from Customers		10 0 0
		Note—Similar entries through the year making a total of		190 0 0
Dec.	31	By Sales		85,000 0 0
,,		,, Work in Progress		28,000 0 0
			£	113,200 0 0

Dr. DEVELOPMENT AND EXPERIMENTAL ORDERS ACCOUNT. *Cr.*

1913 Jan.	1	To Balance brought forward	1,000 0 0	1913 Dec.	31	By Works Profit and Loss a/c to write off this Account	2,000 0 0
		,, Works Cost Allocation Abstract No. 1	23 17 5				
		Note—Similar entries fortnightly during the year making a total of	976 2 7				
			£2,000 0 0				£2,000 0 0

Dr. SCRAP ACCOUNT. *Cr.*

1913 Dec.	31	To Works Profit and Loss Account	1,000 0 0	1913 Jan.	14	By Works Products Abstract No. 1	3 3 2
						Note—Similar entries during the year making a total of	996 16 10
			£1,000 0 0				£1,000 0 0

Manufacturing Ledger.

Works Materials Stock Account.

This account is given, and it will be noted that it is intended to shew the stock value only at the date the accounts are made up, and as shewn by the summary of the Stock Sheets.

Works Materials Suspense Account.

This account is shewn in detail. It will be noted that the debit side opens with the stock at the beginning of the year, and is debited through the year with all purchases, and also with the totals of the Works Completed Products Abstracts, which represent the values of the output on the Process Production and Stock Manufacturing Accounts and sundry other items. The credit side consists of the Purchases Returns, the Materials allocated by the periodical Works Cost Allocation Abstracts rendered during the year, and the scrap credited to cost of orders, as shewn by the Works Completed Products Abstracts. The stock at the end of the year is then taken and credited to the account and debited to Works Materials Stock Account. If all Materials could be charged out exactly during the year, and no special writing down of stock values was necessary, the account should agree, but in practice there is always a difference, which must be transferred to the debit or credit of Works Profit and Loss Account. It should be possible to account for the difference fairly closely. The Works Accounts Annual Abstract should report the difference and give the necessary explanation as to how it has arisen.

6-41. contd.

MANUFACTURING LEDGER—*Continued.*

WORKS MATERIALS STOCK ACCOUNT.

Dr.			£	s.	d.			*Cr.*	£	s.	d.
1913						1913					
Jan.	1	To Stock at this date	10,000	0	0	Jan.	1	By Works Material Suspense a/c, to transfer Stock value	10,000	0	0
Dec.	31	To Works Materials Suspense a/c, Value of Stock at this date	12,900	0	0	Dec.	31	,, Balance carried down	12,900	0	0
			£22,900	0	0				£22,900	0	0
1914											
Jan.	1	To Balance brought down	12,900	0	0						

WORKS MATERIALS SUSPENSE ACCOUNT.

Dr.			£	s.	d.			*Cr.*	£	s.	d.
1913						1913					
Jan.	1	To Works Material Stock a/c, Stock value at this date	10,000	0	0	Jan.	14	By Works Cost Allocation Abstract No. 1	1,204	15	10
,,	14	,, Works Products Abstract No. 1	538	4	6			*Note.*—Similar entries during the year making a total of	13,545	4	2
		Note—Similar entries during the year making a total of	4,911	15	6	Jan.	14	By Works Products a/c, Scrap credited to cost of Orders	12	0	0
Jan.	31	,, Bought Ledger Adjustment a/c Purchases during the month J.	1,180	0	0			*Note*—Similar entries during the year amounting to	188	0	0
		Note—Similar entries during the year making a total of	14,220	0	0	Jan.	31	By Bought Ledger Adjustment a/c, Returns during the month J.	235	0	0
								Note—Similar entries during the year making a total of	765	0	0
						Dec.	31	By Works Materials Stock Account Stock value at this date	12,900	0	0
								By Works Profit and Loss a/c, Amount written off Stock values	2,000	0	0
			£30,850	0	0				£30,850	0	0

Manufacturing Ledger.

Works Disbursements Suspense Account.

This account is shewn in detail.

It is debited during the year by means of Journal entries with the disbursements made through the Wages and Petty Cash Book and with the amounts shewn in the Disbursements column of the Bought Book. The credits are obtained from the Works Cost Allocation Abstracts. The accounts should agree at the end of the year.

Works Wages Suspense Account.

This account is shewn in detail. The wages paid should agree with the wages allocated by the Works Cost Allocation Abstracts. At the end of the financial period it may be necessary to allocate, by the Works Cost Allocation Abstracts, wages chargeable to the particular financial period but not paid until after the date of making up the Accounts. In this case the figure so allocated will be reported in the Works Accounts Annual Abstract, and a reserve for a corresponding amount brought down on the account.

MANUFACTURING LEDGER—*Continued.*

6-41. contd.

Dr. WORKS DISBURSEMENTS SUSPENSE ACCOUNT. Cr.

Date		Particulars	£ s. d.	Date		Particulars	£ s. d.
1913 Jan.	31	To Wages and Petty Adjustment Account — Disbursements during the month J.	0 15 0	1913 Jan.	14	By Works Cost Allocation Abstract No. 1	152 5 6
		Note—Similar entries during the year making a total of	199 5 0			*Note*—Similar entries during the year making a total of	1,047 14 6
,,	,,	To Bought Ledger Adjustment Account — Disbursements during the month J.	100 0 0			By Balance, being Expenditure on Account of 1914 carried down	100 0 0
		Note—Similar entries during the year making a total of	1,000 0 0				
			£1,300 0 0				£1,300 0 0
1914 Jan.	1	To Balance brought down	100 0 0				

Dr. WORKS WAGES SUSPENSE ACCOUNT. Cr.

Date		Particulars	£ s. d.	Date		Particulars	£ s. d.
1913 Jan.	31	To Wages and Petty Ledger Adjustment a/c, Wages for month J.	1,000 0 0	1913 Jan.	14	By Works Cost Allocation Abstract No. 1	736 5 4
		Note—Similar entries during the year making a total of	19,500 0 0			*Note*—Similar entries during the year making a total of	19,863 14 8
Dec.	31	To Reserve for wages accrued to date	100 0 0				
			£20,600 0 0				£20,600 0 0
				1914 Jan.	1	By Balance b/d	100 0 0

Manufacturing Ledger.

Works Expenses Allocation Account.

This account is shewn. It is credited during the year with the amount of Works Expenses or Shop Charges allocated to the Process, Stock Manufacturing and Orders Accounts, as shewn by the Works Cost Allocation Abstracts. At the end of the year the various detailed Works Expenses Accounts, as shewn in the Manufacturing Ledger, are transferred to this account, and the surplus or deficiency is adjusted by an entry allocating it as correctly as possible to the debit or credit of the Process, Stock Manufacturing and Orders Accounts ; the information upon which this adjusting entry is based being shewn in the Works Accounts Annual Abstract.

Works Profit and Loss Account.

This account is shewn in detail. It is in quite simple form but contains the essential figures. It should be noted that the Works Expenses have all been distributed over the Process, Stock Manufacturing and Orders Accounts, the results of which accounts appear in total in the Works Profit and Loss Account. The details of the Works Expenses so distributed are summarised in the Works Expenses Allocation Account. To prepare the Works Profit and Loss Account for inclusion in the Annual Accounts, the details of these accounts are used as shewn in Section VI g. Annual Accounts.

6-41. *contd.*

MANUFACTURING LEDGER—*Continued.*

WORKS EXPENSES ALLOCATION ACCOUNT. (*Debit Side*)

Date		Particulars	£ s. d.
1913 Dec.	31	To Repairs and Renewals—	
		Patterns	39 0 0
		Jigs and Special Tools	311 0 0
		Land and Buildings	300 0 0
		Motive Power Plant	100 0 0
		Mechanical Transmission	100 0 0
		Electrical ,,	100 0 0
		Pipe ,,	50 0 0
		Transportation Plant	100 0 0
		Shop Fixtures	50 0 0
		Special Process Plant	200 0 0
		Machines	600 0 0
		Loose Plant and Tools	2,000 0 0
		Office Furniture and Fittings—Works	150 0 0
		,, Power Generation Expenses	1,000 0 0
		,, Power from Outside Sources	200 0 0
		,, Heating Expenses	200 0 0
		,, Lighting Expenses	250 0 0
		,, Building Attendance	110 0 0
		,, Mechanical Plant Attendance	150 0 0
		,, Electrical Plant Attendance	100 0 0
		,, Belting Attendance	50 0 0
		,, Tool Dressing and Sharpening	100 0 0
		,, Plant Alterations and Removals	50 0 0
		,, Rent, Rates, Taxes and Fire Insurance	1,500 0 0
		,, Works Management and Administration	3,940 0 0
		,, Drawing Office General Charges	150 0 0
		,, Works Stationery	150 0 0
		,, Sundry Minor Expenses	50 0 0
		,, General Stores and Warehouse Expenses	250 0 0
		,, General Carriage and Package Expenses	200 0 0
		,, Material Testing and Treatment	200 0 0
		,, Timber Reparation and Storage	100 0 0
		,, Interdepartmental Transportation	200 0 0
		,, Accident Compensation	200 0 0
		,, National Insurance Expenses	500 0 0
		,, Shop Stores Expenses	100 0 0
		,, Shop Supplies	300 0 0
		,, Overtime Charges	200 0 0
		,, General Labouring	400 0 0
		,, Shop Supervision and Inspection	2,000 0 0
		,, Depreciation	6,950 0 0
			£23,700 0 0

WORKS EXPENSES ALLOCATION ACCOUNT. (*Credit Side*)

Date		Particulars	Process Account.	Stock Manufacturing Account.	Repairs and Sundries Orders.	Sales Orders.	Total.
1913 Jan.	14	By Works Costs Allocation Abstract No. 1	45 6 0	103 2 1	12 15 4	111 3 7	272 7 0
		Note—Similar entries fortnightly during the year amounting to	339 14 0	786 17 11	867 4 8	21,188 16 5	23,182 13 0
Dec.	31	By Works Expenses charged to Adjust. Allocation during the year	15 0 0	10 0 0	20 0 0	200 0 0	245 0 0
			£400 0 0	900 0 0	900 0 0	21,500 0 0	23,700 0 0

Dr. WORKS PROFIT AND LOSS ACCOUNT. *Cr.*

Date		Particulars	£ s. d.	Date		Particulars	£ s. d.
1913 Dec.	31	To Developments and Experiments	2,000 0 0	1913 Dec.	31	By Process a/c balances transferred—	
						Iron Foundry	50 0 0
						Brass ,,	100 0 0
						Smelting ,,	50 0 0
,,	,,	,, Works Materials Suspense a/c, Amount written off Stock values	2,000 0 0	,,	,,	,, Stock Manufacturing a/c	150 0 0
,,	,,	,, Profit and Loss a/c, Balance transferred	50,000 0 0	,,	,,	,, Repairs and Sundries Orders a/c	3,650 0 0
				,,	,,	,, Sales Orders a/c	48,000 0 0
				,,	,,	,, Scrap a/c	1,000 0 0
				,,	,,	,, Pupils' Premiums	1,000 0 0
			£54,000 0 0				£54,000 0 0

Private Journal.

Private Journal.

Assuming the purchase of a business as a going concern, a suitable form of Journal entry opening the books has been set out and followed by a further entry in the event of payment of part of the purchase price in fully paid up shares.

A monthly agreement of the financial books has been suggested in the foregoing pages, the adjusting entries bringing the Wages and Petty Ledger, Purchases and Sales section into the Private Ledger during and at the end of the month have been shewn in detail. The specimen entries are not intended to cover all possible requirements but are sufficiently detailed to shew the method adopted.

6-42.

PRIVATE JOURNAL.

JOURNAL ENTRY FOR OPENING BOOKS ON PURCHASE OF BUSINESS.

				Dr.			Cr.		
1910 Jan.	1	Sundries Dr.							
		To Sundries—							
		For Assets and Liabilities taken over as from this date in accordance with the terms of the Purchase Agreement dated the 15th February, 1910, and made between this Company and the Vendors, The Engineering Development Syndicate, Limited							
		Goodwill Account							
		Patents, Drawings and Patterns							
		Jigs and Special Tools							
		Land and Buildings							
		Motive Power Plant							
		Mechanical Transmission							
		Electrical Transmission							
		Pipe Transmission							
		Transportation Plant							
		Shop Fixtures							
		Special Process Plant							
		Machine Tools							
		Loose Plant and Tools							
		Office Furniture and Fittings—Works							
		" " General							
		Stock Account							
		Wages and Petty Ledger Adjustment a/c (Cash in hand)							
		Bought Ledger Adjustment a/c—							
		For balances appearing in the Bought Ledger, as shewn by summary in Bought Ledger Balances Book, folio —							
		Sales Ledger Adjustment a/c—							
		For balances appearing in the Sales Ledger, as shewn by summary in Sales Ledger Balances Book, folio —							
		Discounts Account—							
		Provision for Discounts Receivable and allowable							
		Bad Debts a/c—							
		Provision against Bad and Doubtful Debts							
		Business Purchase a/c (The Engineering Development Syndicate, Limited)							
		Purchase Price of Business							
				£			£		

6-42. contd.

PRIVATE JOURNAL—*Continued.*

JOURNAL ENTRY FOR PART PAYMENT OF PURCHASE MONEY IN FULLY PAID UP SHARES.

			Dr.	Cr.
1910				
Mar.	31	Business Purchase a/c (The Engineering Development Syndicate, Limited) *Dr.*		
		To Sundries— For the following fully paid up shares of £1 each allotted by Board Minute of this day in part payment of the Purchase Money, and in accordance with the terms of the Purchase Agreement of the 15th February, 1910		
		Ordinary Shares Capital a/c—		
		— Ordinary Shares of £1 each, numbered —— to ——inclusive		
		Preference Shares Capital a/c—		
		— Preference Shares of £1 each, numbered —— to —— inclusive		
			£	£

MONTHLY JOURNAL ENTRIES FOR BRINGING THE WAGES AND PETTY LEDGER SECTION INTO THE PRIVATE LEDGER.

				Dr.	Cr.
1913					
Jan.	31	Wages and Petty Ledger Adjustment a/c *Dr.*			
		To Sales, Repairs and Sundries Account—			
		For amounts received in cash by Petty Cashier during the month, as shewn by folio — of Wages and Petty Ledger			
Jan.	31	Sundries *Dr.*			
		To Wages and Petty Ledger Adjustment a/c—			
		For payments made by Petty Cashier during the month, as shewn by Wages and Petty Ledger			
		Works Disbursements Suspense a/c (as per Wages and Petty Ledger, folio —)			
		Works Wages Suspense a/c (as per Wages and Petty Ledger, folio —)			
		Advertising a/c	£		
		General Office Stationery and Supplies			
		Stamps, Telegrams and Petties			
		Tendering Expenses			
		Total as per General Disbursements a/c in Wages and Petty Ledger, folio —	£		
		Management and General Office Salaries (as per Wages and Petty Ledger, folio —)			

6-42.
contd.

PRIVATE JOURNAL—*Continued.*

WEEKLY AND MONTHLY JOURNAL ENTRIES FOR BRINGING THE PURCHASES SECTION INTO THE PRIVATE LEDGER.

				Dr.	*Cr.*
		WEEKLY ENTRIES.			
1913 Jan.	6	Bought Ledger Adjustment a/c. *Dr.* To Cash— For payments made during the week ending this date, as shewn in Bought Cash Book, folio —			
Jan.	6	Bought Ledger Adjustment a/c. *Dr.* To Discounts a/c— For Discounts taken during the week ending this date, as shewn in Bought Cash Book, folio —			
		MONTHLY ENTRIES.			
Jan.	31	Works Materials Suspense a/c. *Dr.* To Bought Ledger Adjustment a/c— For Purchases during the month, as shewn by Bought Book (Works Expenditure), folio —			
Jan.	31	Bought Ledger Adjustment a/c. *Dr.* To Works Materials Suspense a/c— For Purchases Returns during the month, as shewn by Bought Returns Book (Works Expenditure), folio —			
Jan.	31	Works Disbursements Suspense a/c. *Dr.* To Bought Ledger Adjustment a/c— For Disbursements during the month, as shewn by Bought Book (Works Expenditure), folio —			
Jan.	31	Sundries. *Dr.* To Bought Ledger Adjustment a/c— For Purchases during the month, as shewn by analysis in Bought Book (General Expenditure), folio — Advertising General Office Rent, Rates, Taxes and Insurance General Office Stationery and Supplies (add other Accounts as may be necessary)			
Jan.	31	Bought Ledger Adjustment a/c. *Dr.* To Sundries— For Purchases Returns during the month, as shewn by analysis in Bought Returns Book (General Expenditure), folio— Advertising General Office Rent, Rates, Taxes and Insurance General Office Stationery and Supplies (add other Accounts as may be necessary)			
Jan.	31	Bought Ledger Adjustment a/c. *Dr.* To Bills Payable a/c— For Bills Payable accepted during the month, as per Bills Payable Book, folio —			

PRIVATE JOURNAL—*Continued.*

6-42. contd.

WEEKLY AND MONTHLY JOURNAL ENTRIES FOR BRINGING THE SALES SECTION INTO THE PRIVATE LEDGER.

				Dr.	*Cr.*
1913		WEEKLY ENTRIES.			
Jan.	6	Cash. *Dr.* To Sales Ledger Adjustment a/c— For receipts during the week ending this date, as shewn by Sales Cash Book, folio —			
Jan.	6	Discounts a/c. *Dr.* To Sales Ledger Adjustment a/c— For Discounts allowed during the week ending this date, as shewn by Sales Cash Book, folio —			
		MONTHLY ENTRIES.			
Jan.	31	Sales Ledger Adjustment a/c. *Dr.* To Sales a/c— For Sales during the month, as shewn by Sales Day Book, folio —			
Jan.	31	Sales a/c. *Dr.* To Sales Ledger Adjustment a/c— For Sales Returns during the month, as shewn by Sales Returns Book, folio —			
Jan.	31	Sales Ledger Adjustment a/c. *Dr.* To Sales, Repairs and Sundries a/c— For Sales, Repairs and Sundries during the month, as shewn by Sales, Repairs and Sundries Day Book, folio —			
Jan.	31	Sales, Repairs and Sundries a/c. *Dr.* To Sales Ledger Adjustment a/c— For Sales, Repairs and Sundries Returns during the month, as shewn by Sales, Repairs and Sundries Returns Book, folio —			
Jan	31	Bills Receivable a/c. *Dr.* To Sales Ledger Adjustment a/c— For Bills Receivable drawn during the month, as shewn by Bills Receivable Book, folio —			

Private Journal.

Works Cost Allocation Abstracts.

These abstracts should be rendered to the Financial Dept. fortnightly. The items on each abstract should be posted in detail to their respective accounts in the Private and Manufacturing Ledgers, and the totals passed through the Journal. The specimen Journal entries are shewn, the actual figures being inserted to correspond with the amounts shewn on the Works Cost Allocation Abstract No. 1 as set out in detail here. For future reference, arrangements must be made for the permanent filing of the abstracts, which should bear consecutive numbers.

6-42. contd.

PRIVATE JOURNAL—*Continued.*

FORTNIGHTLY JOURNAL ENTRIES FOR INCORPORATING "THE WORKS COST ALLOCATION ABSTRACTS" INTO THE FINANCIAL BOOKS.

1913				*Dr.*	*Cr.*
Jan.	14	Sundries (as posted in detail from Works Cost Allocation Abstract No. 1) *Dr.*		1,204 15 10	
		To Works Materials Suspense a/c—			1,204 15 10
		For allocation of Materials during the fortnight ending the 14th January, 1913			
Jan.	14	Sundries (as posted in detail from Works Cost Allocation Abstract No. 1) *Dr.*		152 5 6	
		To Works Disbursement Suspense a/c—			152 5 6
		For allocation of payments during the fortnight ending the 14th January, 1913			
Jan.	14	Sundries (as posted in detail from Works Cost Allocation Abstract No. 1) *Dr.*		736 5 4	
		To Works Wages Suspense a/c—			736 5 4
		For allocation of payments during the fortnight ending the 14th January, 1913			
Jan.	14	Sundries (as posted in detail from Works Cost Allocation Abstract No. 1) *Dr.*		272 7 0	
		To Works Expenses Allocation a/c—			272 7 0
		For Works Expenses allocated during the fortnight ending the 14th January, 1913			

6-43. WORKS COST ALLOCATION ABSTRACT.

6-43.

	No. 1. Fortnight Ending 14th Jan. 1913.		Materials.	Disbursements.	Wages.	Shop Charges.	Posting Reference.	Totals.
Orders Series.	A	Sales Orders	413 9 7	81 7 2	173 10 2	111 3 7		779 10 6
	B	Sales, Repair and Sundries Orders	31 4 2	9 3 3	15 2 5	12 15 4		68 5 2
	C	Stock Mfg. Orders	63 1 7		97 1 1	103 2 1		263 4 9
	D	Experimental Orders	10 12 9	7 2 11	6 1 9			23 17 5
Process Accounts.	G	Iron Foundry	31 2 7		68 19 0	15 0 0		115 1 7
	H	Brass Foundry	80 10 6		19 11 2	15 2 0		115 3 8
	K	Smithy	91 3 2		8 18 7	15 4 0		115 5 9
Works Additions.	N1-1	Patents, Drawings and Patterns	1 0 0	2 1 7	7 10 0			10 11 7
	N1-2	Jigs and Special Tools	1 7 8		9 4 0			10 11 8
	N2-1	Land and Buildings	63 11 0		36 10 1			100 1 1
	N2-2	Motive Power Plant	19 2 10		80 18 4			100 1 2
	N2-3	Mechanical Transmission	72 19 3		27 2 0			100 1 3
	N2-4	Electrical Transmission	7 11 5		3 0 4			10 11 9
	N2-5	Pipe Transmission	4 3 9		6 8 1			10 11 10
	N2-6	Transportation Plant	10 11 11					10 11 11
	N2-7	Shop Fixtures	3 1 9		7 10 4			10 12 1
	N2-8	Special Process Plant	1 3 7		9 8 5			10 12 0
	N2-9	Machines	97 3 1		2 18 4			100 1 5
	N3-1	Loose Plant	100 1 6					100 1 6
	N3-2	Office Equipm't—Works	4 7 1		6 5 0			10 12 1
	N3-3	Office Equipm't—Gener'l	6 2 10		4 9 4			10 12 2
Works Repair Expenses.	R1-1	Patterns	0 16 1		4 7 1			5 3 2
	R1-2	Jigs and Special Tools	2 1 7		3 1 8			5 3 3
	R2-1	Land and Buildings	2 2 2		8 10 1			10 12 3
	R2-2	Motive Power Plant	3 3 3		7 9 1			10 12 4
	R2-3	Mechanical Transmission	1 1 2		4 2 2			5 3 4
	R2-4	Electrical Transmission	1 2 1		4 1 4			5 3 5
	R2-5	Pipe Transmission	2 1 1		3 2 5			5 3 6
	R2-6	Transportation Plant	2 2 1		3 1 6			5 3 7
	R2-7	Shop Fixtures	1 2 2		4 1 7			5 3 9
	R2-8	Special Process Plant	2 1 2		3 2 6			5 3 8
	R2-9	Machines	4 4 4		6 8 1			10 12 5
	R3-1	Loose Plant	5 5 5		5 7 1			10 12 6
	R3-2	Office Equipm't—Works	1 3 1		4 0 9			5 3 10
Works General Expenses.	S1-1	Power Generation Expenses	8 1 2		2 9 11			10 11 1
	S1-2	Power from outside sources		5 1 2				5 1 2
	S1-3	Heating Expenses	3 1 1		2 0 2			5 1 3
	S1-4	Lighting Expenses	0 19 7	3 1 9	1 0 0			5 1 4
	S2-1	Building Attendance	2 17 4		2 4 1			5 1 5
	S2-2	Mechanical Plant Attendance	1 2 9		3 18 9			5 1 6
	S2-3	Electrical Plant Attendance	1 5 6		3 16 1			5 1 7
	S2-4	Belting Attendance	3 11 1		1 10 7			5 1 8
	S2-5	Tool Dressing & Sharpening	1 8 2		3 13 7			5 1 9
	S2-6	Plant Removals and Alts.	1 2 3		3 19 9			5 2 0
	S3-1	Rents, Rates, Taxes, Fire Insur. & Fire Prevention		10 11 2				10 11 2
	S3-2	Works Management and Administration		10 11 3				10 11 3
	S3-3	Drawing Office General Charges	2 19 1	2 3 0				5 2 1
	S3-4	Works Stationery	5 2 2					5 2 2
	S3-5	Sundry Minor Expenses		3 1 1	2 1 2			5 2 3
	S4-1	General Stores and Warehouse Expenses	0 9 10		4 12 6			5 2 4
	S4-2	General Carriage and Package Expenses	5 2 5					5 2 5
	S4-3	Material Testing and Treatment	1 1 2		4 1 4			5 2 6
	S4-4	Timber Preparation and Storage			5 2 7			5 2 7
	S4-5	Interdepartmental Transportation			10 12 2			10 12 2
	S5-1	Accident Compensation		5 2 8				5 2 8
	S5-2	National Insurance Exps.		10 11 4				10 11 4
	S6-1	Shop Stores Expenses			5 2 9			5 2 9
	S6-2	Shop Supplies	5 2 10					5 2 10
	S6-3	Overtime Charges			5 2 11			5 2 11
	S6-4	General Labouring			10 1 5			10 1 5
	S6-5	Shop Supervision and Inspection			10 1 6			10 1 6
Works Sundry Accounts.	U1-1	Commercial Expenses	1 6 10	2 7 2	1 9 0			5 3 0
	U1-2	Repairs, Office Equipm't	3 1 9		2 1 4			5 3 1
	U2-1	Scrap Debits	15 3 2					15 3 2
			1204 15 10	152 5 6	736 5 4	272 7 0		2365 13 8

Fortnightly Abstracts should terminate on the day corresponding with end of Wages Week.

Private Journal.

Works Products Abstracts.

These abstracts should be rendered fortnightly, as in the case of the Works Cost Allocation Abstracts. The detailed items should be posted to their respective accounts and the totals passed through the Journal in the form of the entry shewn on the opposite page. The form of Abstract is set out in detail here.

6-42. contd.

PRIVATE JOURNAL—*Continued.*

FORTNIGHTLY JOURNAL ENTRY FOR INCORPORATING THE WORKS PRODUCTS ABSTRACT IN THE FINANCIAL BOOKS.

				Dr.	*Cr.*
1913					
Jan.	14	Works Material Suspense a/c. *Dr.*		538 4 6	
		To Sundries (as posted in detail from Works Products Abstract No. 1)			538 4 6
		For amounts shewn in this Abstract chargeable to Works Materials Suspense a/c for the fortnight ending the 14th January, 1913			

6-44.

WORKS PRODUCTS ABSTRACT.

6-44.

NO. 1.—FORTNIGHT ENDING 14TH JAN. 1913.

SUMMARY OF AMOUNTS DEBITED TO WORKS MATERIALS SUSPENSE ACCOUNT AND CREDITED TO THE UNDERMENTIONED ACCOUNTS.

Works Expenditure Book Ref.		Posting Reference.			
	Process Account—Iron Foundry		101	1	1
	,, ,, Brass Foundry		102	2	2
	,, ,, Smithy		103	3	3
	Stock Manufacturing a/c		204	4	4
	Sales Orders —Returns from Customers		10	0	0
	Sales, Repairs and Sundries Orders— ,, ,,		2	10	6
	Scrap a/c —Scrap not credited to cost of Orders		3	3	2
	Works Materials Suspense a/c—Scrap credited to cost of Orders		12	0	0
	Total debited to Works Materials Suspense a/c		538	4	6

Private Journal.

Works Accounts Annual Abstract.

The Works Cost Allocation Abstracts and the Works Products Abstract previously mentioned, provide all that is necessary so far as the financial accounts are concerned during the currency of a financial period. At the end of the period further information is required for the preparation of the Balance Sheet and Profit and Loss Accounts. The Works Accounts Annual Abstract provides this information in a concise form. It is assumed that the financial period runs for a full year, ending on the 31st December. The Works Accounts Annual Abstract must be rendered as at that date to the Financial Dept. The Journal entries incorporating certain of the items appearing in the abstract in the Financial Books are shewn and followed by the actual form itself. It will be noted that certain items set out in the abstract can be brought down on their respective accounts in the Financial Books, and therefore, no Journal entries are necessary with regard to these items.

6-42. contd.

PRIVATE JOURNAL—*Continued.*

ANNUAL JOURNAL ENTRIES FOR INCORPORATING CERTAIN FIGURES APPEARING IN THE WORKS ACCOUNTS ANNUAL ABSTRACTS IN THE FINANCIAL BOOKS.

				Dr.	*Cr.*
1913 Dec.	31	Depreciation a/c. *Dr.*		7,150 0 0	
		To Sundries—			
		To Write off Depreciation on the following accounts for the year 1913, as recommended in Works Accounts Annual Abstract:			
		Land and Buildings			1,975 0 0
		Motive Power Plant			275 0 0
		Mechanical Transmission			350 0 0
		Electrical Transmission			250 0 0
		Pipe Transmission			175 0 0
		Transportation Plant			450 0 0
		Shop Fixtures			175 0 0
		Special Process Plant			500 0 0
		Machines			1,875 0 0
		Office Furniture and Fittings (Works)			75 0 0
		,, ,, (General)			50 0 0
		Patents, Drawings and Patterns			1,000 0 0
Dec.	31	Works Materials Stock a/c. *Dr.*		12,900 0 0	
		To Works Materials Suspense a/c—			12,900 0 0
		For the following Stock values at this date, as certified in Works Accounts Annual Abstract:			
		General Stock 4,000 0 0			
		Component Stock 4,000 0 0			
		Completed Product 4,800 0 0			
		Discarded Plant Scrap Values 100 0 0			
		£12,900 0 0			
Dec.	31	Sundries. *Dr.*			
		To Works Expenses Allocation a/c—			245 0 0
		To adjust allocation of Works Expenses for the year 1913, as shewn by Works Accounts Annual Abstract.			
		Sales Orders Account		200 0 0	
		Sales, Repairs and Sundries Orders a/c		20 0 0	
		Stock Manufacturing a/c		10 0 0	
		Iron Foundry a/c		5 0 0	
		Brass Foundry a/c		5 0 0	
		Smithy a/c		5 0 0	

6-45.

6-45. **WORKS ACCOUNTS ANNUAL ABSTRACT.** 31st December, 1913.

1. Work-in-Progress.		
Orders—Series A. Sales		28,000 0 0
,, B. Sales, Repairs and Sundries		2,000 0 0
		£30,000 0 0
Stock Manufacturing a/c.		1,100 0 0
Process a/c—Iron Foundry		250 0 0
,, Brass Foundry		400 0 0
,, Smithy		350 0 0
(The above items should be brought down as balances on their respective Accounts at the 31st December, 1913.)		£2,100 0 0
2. Values to be Carried Forward.		
Development and Experimental a/c.		(nil.)
Patents, Drawings and Patterns—£1000 written off (see Depreciation figures below).		
3. Stock.		
General		4,000 0 0
Components		4,000 0 0
Complete Product		4,800 0 0
Discarded Plant Scrap Values		100 0 0
(See entry in Private Journal folio —)		£12,900 0 0
Loose Plant		£12,000 0 0
Jigs and Special Tools		£3,000 0 0
(The last-mentioned items should be brought down as balances on their respective accounts.)		
	Normal at average rate on Capital values.	Extra on individual discarded items.
4. Depreciation for Year 1913.		
Land and Buildings (Offices £150)	1,975 0 0	
Motive Power Plant	225 0 0	50 0 0
Mechanical Transmission	350 0 0	
Electrical Transmission	250 0 0	
Pipe Transmission	175 0 0	
Transportation Plant	450 0 0	
Shop Fixtures	175 0 0	
Special Process Plant	450 0 0	50 0 0
Machines	1,825 0 0	50 0 0
Office Furniture and Fittings (Works)	75 0 0	
,, ,, (General)	50 0 0	
Patents, Drawings and Patterns	1,000 0 0	
(See entry in Private Journal folio —)	£7,000 0 0	£150 0 0
	£7,150	
5. Advance Expenditure.		
Proportion of Rates paid in advance		50 0 0
,, Fire Insurance Premiums paid in advance		50 0 0
(The total of these items is brought down as a balance on the Works Disbursements Suspense a/c.)		£100 0 0
6. Materials Reserve.		
Reserve for Materials delivered but not invoiced		(nil.)
(If any reserve is made, it must be brought down on the Works Material Suspense a/c.)		
7. Wages Reserve.		
Wages included in Cost Allocation up to the 31st December, 1913, but paid in 1914		£100 0 0
(This figure is brought down as a balance on the Works Wages Suspense Account.)		
8. Works Expenses Supplementary Allocation.		
Additional Allocation as under		
Orders—Series A. Sales		200 0 0
,, ,, B. Repairs and Sundries		20 0 0
Stock Manufacturing a/c		10 0 0
Process Account—Iron Foundry		5 0 0
,, Brass Foundry		5 0 0
,, Smithy		5 0 0
(See entry in Private Journal folio —)		£245 0 0

......................................Works Manager.

..............................General Manager. ....Works Accountant.

The Annual Abstract is in such form as to serve as a permanent certificate from the responsible officials of the position of the Works Accounts at the date of the preparation of the Balance Sheet.

Private Balances Book.

Private Balances Book.

The ruling of this book provides for the balances to be taken out monthly, and it will be found convenient to include a period of six months in each opening of the book, as shewn by the form below. The book should contain the balances appearing on the accounts in the Private and Manufacturing Ledgers and also the Private Cash Book balance. These figures cover the whole of the accounts, and consequently the balances should be in agreement.

6-46.

PRIVATE BALANCES BOOK.

Ledger Folio.	Name of Account.	January.		February.		March.		April.		May.		June.	
		Dr.	Cr.	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.

Section VI g

Annual Accounts.

General Outline.

THE Annual Accounts may be divided into two sections, viz. :

1. The Accounts as prepared for the information of the Directors.
2. The Accounts printed and issued to the Shareholders.

In the first case full detail must be shewn. In the second, the Accounts should be set out in a concise form, so as to present a clear view of the position of the business without giving away information likely to be useful to trade competitors.

1. *The Accounts as prepared for the Information of the Directors.*

A suggested set of accounts is shewn. It will be noted that they consist of a Balance Sheet, Profit and Loss Account, Works Profit and Loss Account, and a schedule shewing the details of the Works Expenses, the latter being included in total in the Works Profit and Loss Account. The Profit and Loss Account and Works Profit and Loss Account should agree with the same Accounts, as shewn in the Private Ledger. The Balance Sheet items should agree with the figures shewn in the Private Balances Book, all the necessary summaries for this agreement being clearly shewn in this book. These summaries should be made in such form that they shew not only the figures appearing in the detail Balance Sheet, but also the final figures appearing in the Balance Sheet printed and issued to the shareholders.

The Profit and Loss Account is drawn in the ordinary form, but some explanation is necessary as to the form of the Works Profit and Loss Account. The debit and credit sides contain five headings, viz. : Process Account, Stock Manufacturing Account, Sales, Repairs and Sundries Orders Account, Sales Orders Account and Total. Each of the first four headings contains on the debit side the Work-in-Progress under that class at the beginning of the year. On the credit side the first item deals with Output charged to

General Outline.

Stock, from the Process Account and Stock Manufacturing Account, the second item gives the Sales under their respective heads, and the final item shews the Work-in-Progress at the end of the year. It will be noted that all the Output under the Process Accounts and the Stock Manufacturing Account is sold to Stock, and that the figures appearing as " Output charged to Stock " under these accounts represent the Works value of such output. The Works value put upon such output should be the cost as nearly as possible, but it does not follow that it will be the actual cost in every case. It may be, on account of special circumstances, goods have been manufactured at a cost in excess of their Works value. In that case they cannot be put upon Stock at the cost but must be charged at the Works value. The Works value must be settled when the Works Accounts Office put through the entry in the Works Expenditure Book. This question is further discussed under Works Accounts.

If worked out exactly there should be no balance either of profit or loss on the Process Accounts and the Stock Manufacturing Account, but in practice and under the conditions mentioned in the previous paragraph, there will always be a difference. In the accounts shewn it has been assumed that there are small profits. This points to the fact that Stock Account has been slightly overcharged. A large profit on these accounts should not be accepted as it might mean an over-valuation of stock. On the other hand, a large loss is equally wrong as it might mean a considerable under-valuation of stock.

The Sales, Repairs and Sundries Orders and Sales Orders columns deal with the goods actually sold in course of business. The amount included in Materials in these columns is made up of the value of Materials drawn from Stock, or purchased direct for the particular orders.

Under this system it is unnecessary to bring in the Stock at the beginning and end of the financial year, but after bringing down the balance on the first section of the Works Profit and Loss Account as shewn, a question arises as to the necessity for special writing down of Stock values. In most engineering and manufacturing undertakings a certain amount of the Stock is bound to depreciate in value below the actual original cost at which it appears in the accounts. This depreciation is estimated when the Stock is taken and a special entry made for the amount written off, the debit for which appears in the Works Profit and Loss Account as shewn.

With regard to the Schedule of Works Expenses, it will be noted that the total agrees with the total of Works Expenses shewn in the Works Profit and Loss Account, which is made up of the various amounts allocated during the year to each class of product on the system referred to in detail under Works Accounts (Section IV c).

6·47.

DETAILED BALANCE SHEET.

(Debit Side.) W. BLANK & CO. LIMITED.

To Capital—			
Authorised			
100,000 Cumulative 6 % Preference Shares of £1 each		100,000 0 0	
100,000 Ordinary Shares of £1 each		100,000 0 0	
200,000 Shares		£200,000 0 0	
Issued			
95,000 Cumulative 6 % Preference Shares of £1 each		95,000 0 0	
75,000 Ordinary Shares of £1 each		75,000 0 0	
170,000 Shares			170,000 0 0
To Five per cent. First Mortgage Debentures			50,000 0 0
To Reserve Account			6,000 0 0
To Creditors—			
Sundry Accounts		10,000 0 0	
Bills payable		5,000 0 0	
			15,000 0 0
To Unclaimed Dividends and Interests			150 0 0
To Debenture Interest accrued			1,250 0 0
To Profit and Loss Account—			
Balance brought forward from last Account		19,500 0 0	
Deduct Appropriations and Dividends for year 1912 as per last Directors' Report—			
Amount written off Preliminary Expenses	1,000 0 0		
Amount transferred to Reserve	4,000 0 0		
Preference Share Dividend for 1912	5,700 0 0		
Ordinary Share Dividend at 10 % for 1912	7,500 0 0	18,200 0 0	
Balance brought forward		1,300 0 0	
Add Profit for year 1913	23,000 0 0		
Deduct Debenture Interest for 1913	2,500 0 0	20,500 0 0	
			21,800 0 0
			£264,200 0 0

6-47.

DETAILED BALANCE SHEET.

31ST DECEMBER, 1913. *(Credit Side.)*

By Cash—						
At Bankers	65,000	0	0			
In hand	200	0	0	65,200	0	0
By Debtors (*less* provision for bad and doubtful debts)				20,000	0	0
By Investments at cost or under				4,000	0	0
By Work in Progress—						
Outlay to date on uncompleted Sales, Repair and Sundry Orders	30,000	0	0			
Less Cash received on account	5,000	0	0	25,000	0	0
By Stocks—						
Raw and Finished Materials and Sundries	12,900	0	0			
Jigs and Special Tools	3,000	0	0			
Loose Plant and Tools	12,000	0	0			
Work in Progress on Process and Stock Manufact'ing Accounts	2,100	0	0	30,000	0	0
By Freehold and Leasehold Land and Buildings—						
As at 1st January, 1913	40,825	0	0			
Deduct Depreciation written off	1,975	0	0			
	38,850	0	0			
Add Additions during the year	1,150	0	0	40,000	0	0
By Motive Power Plant—						
As at 1st January, 1913	2,900	0	0			
Deduct Depreciation written off	275	0	0			
	2,625	0	0			
Add Additions during the year	125	0	0	2,750	0	0
By Mechanical Transmission—						
As at 1st January, 1913	3,675	0	0			
Deduct Depreciation written off	350	0	0			
	3,325	0	0			
Add Additions during the year	175	0	0	3,500	0	0
By Electrical Transmission—						
As at 1st January, 1913	2,400	0	0			
Deduct Depreciation written off	250	0	0			
	2,150	0	0			
Add Additions during the year	350	0	0	2,500	0	0
By Pipe Transmission—						
As at 1st January, 1913	1,825	0	0			
Deduct Depreciation written off	175	0	0			
	1,650	0	0			
Add Additions during the year	100	0	0	1,750	0	0
By Transportation Plant—						
As at 1st January, 1913	4,650	0	0			
Deduct Depreciation written off	450	0	0			
	4,200	0	0			
Add Additions during the year	300	0	0	4,500	0	0
By Shop Fixtures—						
As at 1st January, 1913	1,825	0	0			
Deduct Depreciation written off	175	0	0			
	1,650	0	0			
Add Additions during the year	100	0	0	1,750	0	0
By Special Process Plant—						
As at 1st January, 1913	7,275	0	0			
Deduct Depreciation written off	500	0	0			
	6,775	0	0			
Add Additions during the year	725	0	0	7,500	0	0
By Machines—						
As at 1st January, 1913	28,875	0	0			
Deduct Depreciation written off	1,875	0	0			
	27,000	0	0			
Add Additions during the year	2,000	0	0	29,000	0	0
By Office Furniture and Fittings (Works)—						
As at 1st January, 1913	750	0	0			
Deduct Depreciation written off	75	0	0			
	675	0	0			
Add Additions during the year	75	0	0	750	0	0
By Office Furniture and Fittings (General)—						
As at 1st January, 1913	500	0	0			
Deduct Depreciation written off	50	0	0			
	450	0	0			
Add Additions during the year	50	0	0	500	0	0
By Patterns, Drawings and Patent Rights						
As at 1st January, 1913	5,000	0	0			
Deduct Amount written off	1,000	0	0			
	4,000	0	0			
Add Additions during the year	500	0	0	4,500	0	0
By Goodwill as at 1st January, 1913				20,000	0	0
By Preliminary Expenses	4,000	0	0			
Less Amount written off to date	3,000	0	0	1,000	0	0
				£264,200	0	0

6-48.

PROFIT AND LOSS ACCOUNT.

(Debit Side.) **W. BLANK & CO. LIMITED.**

1913								
Dec.	31	To Advertising	2,350	0	0			
		,, Agents' Commissions	1,750	0	0			
		,, Bad Debts	550	0	0			
		,, Bank Charges and Interest	275	0	0			
		,, Debenture Trustees' Fees	150	0	0			
		,, Depreciation of General Office Buildings, Furniture, Fittings, etc.	200	0	0			
		,, Directors' Fees	950	0	0			
		,, General Office, Heating, Cleaning, Lighting, etc.	250	0	0			
		,, ,, Rent, Rates, Taxes and Insurance	200	0	0			
		,, ,, Stationery and Supplies	400	0	0			
		,, ,, Equipment Repairs	50	0	0			
		,, General Travelling Expenses	650	0	0			
		,, Income Tax	1,000	0	0			
		,, Law Costs	100	0	0			
		,, Management and General Office Salaries	10,000	0	0			
		,, Stamps, Telegrams and Petties	715	0	0			
		,, Show and Demonstration Expenses	2,500	0	0			
		,, Tendering Expenses	2,950	0	0			
		,, Travellers' Salaries and Expenses	3,750	0	0			
						28,790	0	0
		,, Balance, being profit for the year ending 31st December, 1913, transferred to Balance Sheet				23,000	0	0
						£51,790	0	0

6-48.

PROFIT AND LOSS ACCOUNT.

FOR THE YEAR ENDING 31ST DECEMBER, 1913. (*Credit Side.*)

1913				
Dec.	31	By Works Profit and Loss Account, balance transferred		50,000 0 0
		,, Discounts		750 0 0
		,, Royalties		1,000 0 0
		,, Transfer Fees		40 0 0
				51,790 0 0

6·49. WORKS PROFIT AND LOSS ACCOUNT.

(Debit Side.) W. BLANK & CO. LIMITED.

	Process a/c.	Stock Manufacturing a/c.	Repairs and Sundries Orders a/c.	Sales Orders a/c.	Total.
To Work in Progress	1,100 0 0	1,000 0 0	1,000 0 0	15,000 0 0	18,100 0 0
,, Materials	1,600 0 0	500 0 0	2,650 0 0	10,000 0 0	14,750 0 0
,, Disbursements			300 0 0	1,000 0 0	1,300 0 0
,, Labour	900 0 0	800 0 0	1,400 0 0	17,500 0 0	20,600 0 0
,, Works Expenses	400 0 0	900 0 0	900 0 0	21,500 0 0	23,700 0 0
,, Balance carried down	200 0 0	150 0 0	3,650 0 0	48,000 0 0	52,000 0 0
	£4,200 0 0	3,350 0 0	9,900 0 0	113,000 0 0	130,450 0 0

To Development and Experiments	2,000 0 0
,, Amount written off Stock Values	2,000 0 0
,, Works Profit for the year ending 31st December, 1913, carried to Profit and Loss Account	50,000 0 0
	£54,000 0 0

6·50. SCHEDULE OF WORKS EXPENSES.

YEAR ENDING 31ST DECEMBER, 1913.

Repairs and Renewals—Patterns	39 0 0
,, Jigs and Special Tools	311 0 0
,, Land and Buildings	300 0 0
,, Motive Power Plant	100 0 0
,, Mechanical Transmission	100 0 0
,, Electrical ,,	100 0 0
,, Pipe ,,	50 0 0
,, Transportation Plant	100 0 0
,, Shop Fixtures	50 0 0
,, Special Process Plant	200 0 0
,, Machines	600 0 0
,, Loose Plant and Tools	2,000 0 0
,, Office Furniture and Fittings—Works	150 0 0
Power Generation Expenses	1,000 0 0
Power from outside sources	200 0 0
Heating Expenses	200 0 0
Lighting Expenses	250 0 0
Building Attendance	110 0 0
Mechanical Plant Attendance	150 0 0
Electrical Plant Attendance	100 0 0
Belting Attendance	50 0 0
Tool Dressing and Sharpening	100 0 0
Plant Alterations and Removals	50 0 0
Rent, Rates, Taxes and Fire Insurance	1,500 0 0
Works Management and Administration	3,940 0 0
Drawing Office General Charges	150 0 0
Works Stationery	150 0 0
Sundry Minor Expenses	50 0 0
General Stores and Warehouse Expenses	250 0 0
General Carriage and Package Expenses	200 0 0
Material Testing and Treatment	200 0 0
Timber Preparation and Storage	100 0 0
Interdepartmental Transportation	200 0 0
Accident Compensation	200 0 0
National Insurance Expenses	500 0 0
Shop Stores Expenses	100 0 0
Shop Supplies	300 0 0
Overtime Charges	200 0 0
General Labouring	400 0 0
Shop Supervision and Inspection	2,000 0 0
Depreciation	6,950 0 0
Total as appearing in Works Profit and Loss a/c	£23,700 0 0

6-49.

WORKS PROFIT AND LOSS ACCOUNT.

FOR THE YEAR ENDING 31ST DECEMBER, 1913. (*Credit Side.*)

	Process a/c.	Stock Manufacturing a/c.	Repairs and Sundries Orders a/c.	Sales Orders a/c.	Total.
By Output charged to Stock	3,200 0 0	2,250 0 0			5,450 0 0
,, Sales			7,900 0 0	85,000 0 0	92,900 0 0
,, Work in Progress	1,000 0 0	1,100 0 0	2,000 0 0	28,000 0 0	32,100 0 0
	£4,200 0 0	3,350 0 0	9,900 0 0	113,000 0 0	130,450 0 0

By Balance brought down	52,000 0 0
,, Scrap sold but not credited to individual orders	1,000 0 0
,, Pupils' Premiums	1,000 0 0
	£54,000 0 0

Balance Sheet.

2. *The Accounts Printed and Issued to the Shareholders.*

The suggested form of accounts is shewn. No separate Profit and Loss Account is given. The printed accounts must comply with the provisions of the Articles of Association of the Company, consequently it may be necessary to print a Profit and Loss Account or to make other modifications. The form suggested complies with the provisions of the Articles of Association of many companies, and is therefore put forward. It will be noted that the Profit for the year is arrived at before charging Directors' and Debenture Trustees' Fees, Depreciation and Income Tax, the charges in respect of these items being shewn and deducted from the Profit figure.

6-51.

SUMMARISED BALANCE SHEET.

(*Debit Side.*) W. BLANK & CO. LIMITED.

To Capital—				
Authorised.				
100,000 Cumulative 6 % Preference Shares of £1 each			100,000 0 0	
100,000 Ordinary Shares of £1 each			100,000 0 0	
200,000 Shares			£200,000 0 0	
Issued.				
95,000 Cumulative 6 % Preference Shares of £1 each			95,000 0 0	
75,000 Ordinary Shares of £1 each			75,000 0 0	
170,000 Shares				170,000 0 0
To Five Per Cent. First Mortgage Debentures				50,000 0 0
To Reserve Account				6,000 0 0
To Creditors—				
Sundry Accounts			10,000 0 0	
Bills Payable			5,000 0 0	
				15,000 0 0
To Unclaimed Dividends and Interests				150 0 0
To Debenture Interest Accrued				1,250 0 0
To Profit and Loss Account—				
Balance brought forward from last account			19,500 0 0	
Less Appropriations and Dividends for Year 1912			18,200 0 0	
Balance brought forward			1,300 0 0	
Add.				
Trading Profit for Year 1913		32,250 0 0		
Deduct.				
Debenture Trustees 'Fees	150 0 0			
Directors' Fees	950 0 0			
Depreciation	7,150 0 0			
Income Tax	1,000 0 0			
		9,250 0 0		
			23,000 0 0	
			24,300 0 0	
Deduct.				
Debenture Interest for Year 1913			2,500 0 0	
				21,800 0 0
				£264,200 0 0

The printed accounts must be accompanied by the Directors' Report to the shareholders and the notice calling the General Meeting. No form of Directors' Report is shewn, but it is well to remember that too much care cannot be taken in settling the form of the first Annual Report and Accounts. They should be concise, and contain such information as can be given on all future occasions with slight modification. Alterations in the Report and Accounts, such as the omission of information given in a previous year, should be avoided, as always provocative of discussion at General Meetings. **Balance Sheet.**

SUMMARISED BALANCE SHEET.

31st December, 1913. *(Credit Side.)* *6-51.*

By Cash—						
At Bankers	65,000	0	0			
In hand	200	0	0			
				65,200	0	0
By Debtors				20,000	0	0
By Investments at cost or under				4,000	0	0
By Stock of Stores, Timber, Metals, Loose Plant, Tools, etc., and Work-in-Progress				55,000	0	0
By Freehold and Leasehold Land, Buildings, Machinery, Plant, etc.—						
As at 1st January, 1913	95,500	0	0			
Add Additions during the Year	5,150	0	0			
	100,650	0	0			
Deduct Depreciation written off	6,150	0	0			
				94,500	0	0
By Patterns, Drawings and Patent Rights						
As at 1st January, 1913	5,000	0	0			
Add Additions during the Year	500	0	0			
	5,500	0	0			
Deduct Depreciation written off	1,000	0	0			
				4,500	0	0
By Goodwill				20,000	0	0
By Preliminary Expenses	4,000	0	0			
Less Amount written off to date	3,000	0	0	1,000	0	0
				£264,200	0	0

Section **VI h**

Audit.

Auditors' Requirements.

It is perhaps needless to state that the accounts should be audited by properly qualified professional accountants. It is not desirable or necessary to offer any advice as to how the audit of an engineering and manufacturing concern should be carried out ; the professional auditors will be quite competent to judge for themselves as to what work it will be necessary to do, but the staff of the Company can do a great deal to help the auditors in their work. This help will enable the auditors to carry out their duties with the maximum of satisfaction to themselves and the Company, and at the minimum of expense to the Company as regards audit fee. It is in this connection that the following suggestions are offered :

1. *Purchase Invoices and Credit Notes.*

   These should be properly filed so as to admit of immediate reference to the documents themselves and to the method in which they have been treated in the Works Accounts.

2. *Sales Invoices and Credit Notes.*

   Immediate reference to the Press Copy Invoice Book or carbon copies of invoices should be available, and the system of filing carbon copies should be arranged to provide this readily.

3. *Vouchers for Payments made.*

   System of filing to admit of immediate reference.

4. *Receipts.*

   Proper system of recording all receipts given to be enforced.

5. *Creditors' Statements.*

   Stock-taking statements to be written for from all creditors, such statements to be agreed with the accounts in the Bought Ledger and filed in order of the accounts in that Ledger. This arrangement permits of easy reference and enables the auditors to satisfy themselves as to the agreement between the creditors accounts in the Bought Ledger and their statements. In some few cases arrangements are made for the Stock-taking Statements to be sent direct to the Auditors by the creditors.

6. *Bought and Sales Ledgers.*

   All accounts in these ledgers to be marked off so as to shew clearly the outstanding items making up the balances brought down.

7. *Postings and Castings.*

Auditors' Requirements

Postings and castings of all books to be checked by the Accountant's Department of the Company.

8. *Closing of Books.*

All accounts to be closed and balances brought down.

9. *Balances.*

All Balances to be taken out and agreed. A copy of the Private and Manufacturing Ledger Balances to be made and handed to the auditors for their record.

10. *Bank Balances.*

Banks to be requested to forward direct to the auditors, certificates of all balances at date of making up the accounts.

11. *Properties and Investments.*

Deeds and certificates for investments to be listed and ready for inspection of auditors.

12. *Following Certificates to be handed to the Auditors.*

(*a*) *Liabilities.*

Certificate signed by General Manager and Accountant that all liabilities have been entered in the books.

(*b*) *Debts due to the Company.*

Certificate signed by General Manager and Accountant that Book Debts are of the realisable value appearing in the books, subject to the reserves for Bad and Doubtful Debts and Discounts.

(*c*) *Additions to Buildings, Plant, etc.*

Certificate signed by General Manager and Works Manager setting out class totals of additions to buildings, plant, etc., during the year, and stating that such additions are in their opinion properly so charged.

(*d*) *Depreciation of Buildings, Plant, etc.*

Certificate signed by General Manager and Works Manager setting out depreciation written off the different classes of buildings, plant, etc., and stating that in their opinion the amounts so written off are sufficient.

Auditors' Requirements.

(*e*) *Stocks, including Loose Plant and Tools.*

Certificate signed by General Manager, Works Manager and Works Accountant, giving summary of the different classes of stock, and stating that it has been taken at or under cost price, and that in no case does the value exceed the market price. The Stock Sheets themselves should be signed by the persons responsible for taking the stock and for working out the calculations.

(*f*) *Work-in-Progress.*

Certificate signed by the General Manager, Works Manager and Works Accountant, stating that the Work-in-Progress has been valued at or under cost price, and that in no case does the value exceed the selling price after providing for selling expenses.

13. *Balance Sheet and Profit and Loss Account.*

Hand to the auditors copies of the detailed Balance Sheets and Profit and Loss Accounts, and print of the accounts to be submitted to the shareholders.

It is not suggested that the foregoing will cover the whole of the auditors' requirements, but it is certain that they will appreciate the care and attention given by the Company's staff to the preparation in this manner of the books, accounts, and records, so as to enable them to carry out their duties without unnecessary waste of time.

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Items in heavy type refer to section titles or sub-section titles, as appearing in margin of book.

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